REVIEW OF WASTE EXCHANGE PROGRAMS
FINAL REPORT

CCREM-TS/WM-TRE002 JUNE 1988

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REVIEW OF WASTE EXCHANGE PROGRAMS

FINAL REPORT

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EXECUTIVE SUMMARY

In November 1987, the Canadian Council of Resource and Environment Ministers commissioned a review of waste exchange programs in Canada, the United States and overseas. The objectives of this study were:

- to examine the effectiveness of waste exchanges in reducing the quantity of hazardous wastes that would otherwise require treatment or disposal
- to recommend means of improving their effectiveness in achieving this goal
- to identify opportunities that could be used to increase financial self-sufficiency of waste exchanges.

These objectives were accomplished through a review of the current scientific and technical literature and the administration of a comprehensive survey of 23 waste exchange operations located in Canada, the United States and Europe. Interviews were also conducted with industry and government representatives.

The major conclusions of the study with respect to existing waste exchanges in Canada can be summarized as follows:

- waste exchanges in Canada are underfunded, though they are reasonably effective in initiating transfers of waste products despite their financial handicap
- the effectiveness of the exchanges could be improved, however, with increased funding
- increased funding would best be directed towards improving marketing, developing appropriate business plans, adopting a pro-active approach to the exchange of wastes and increasing the level of staffing

- increased financial self-sufficiency could be achieved through advertising, seminars, publications, consulting and the imposition of various fees on users

- industry is generally poorly informed about the potential for recycling hazardous wastes and is generally disinterested in accepting the direct responsibility for funding waste exchanges; industry sees government as having the primary obligation for funding

Based on the findings, three scenarios were identified for further analysis, namely:

- continuation of the existing low level of government funding

- provision of long term government funding at substantially increased levels

- short term increased government funding to be phased out in favor of industry funding.

For the latter two scenarios, funding could be provided through existing programs or new mechanisms.

The third scenario was determined to be preferable to the others as it best met the objectives stated for this study. Key recommendations associated with this scenario were as follows:

- a three tiered (national, regional, local) waste exchange system should be created

- government should ensure funding is available for the first five years

- industry should assume funding responsibility subsequent to the phaseout of government funding at a level adequate to operate the system effectively

- direct industry funding should be accomplished through compulsory membership by all registered hazardous waste generators

- waste exchanges should be required to submit and adhere to formal business plans

- joint industry/government advisory boards should be created to provide long-term guidance and review waste exchange operations

- additional efforts should be made to market the waste exchanges and develop additional sources of funding

- government should encourage the exchange of wastes as an alternative to disposal through the development of appropriate disposal fees, taxes on hazardous waste generators, tax credits and other fiscal measures for processes utilizing waste products, and further standardization of legislative controls.

RÉSUMÉ

En novembre 1987, le Conseil canadien des ministres des Ressources et de l'Envirronement a commandé une étude des programmes d'échange de déchets au Canada, aux États-Unis et outre-mer, dans le but:

- de déterminer l'efficacité des programmes de déchets à réduire la quantité des déchets dangereux à traiter ou éliminer;

- de recommander des moyens d'accroître l'efficacité des programmes d'échange pour en arriver à ce but;

- de relever les possibilités qui permettraient à ces programmes de s'autofinancer davantage.

Ces objectifs ont été atteints grâce à l'examen des publications scientifiques et techniques actuelles ainsi qu'à la réalisation d'une enquête complète sur 23 bourses de déchets au Canada, aux États-Unis et en Europe. Des entrevues ont également été organisées avec les représentants de l'industrie et des gouvernements fédéral et provinciaux.

En ce qui concerne les bourses canadiennes de déchets, les principales conclusions de l'étude peuvent être résumées comme suit:

- au Canada, les bourses de déchets ne sont pas suffisamment financées, mais elles réussissent dans une mesure raisonnable à favoriser l'échange de déchets en dépit de ce handicap financier;

- l'efficacité des échanges pourrait toutefois être accrue avec plus de fonds;

- les fonds additionnels devraient servir à améliorer le marketing, élaborer des projets d'entreprise convenables, adopter une approche proactive en matière d'échange de déchets et augmenter le personnel;

- il serait possible d'accroître l'autosuffisance financière par la publicité, des colloques, des publications, la consultation et l'imposition de divers frais aux usagers;

- en général, l'industrie connaît mal les possibilités de recyclage des déchets dangereux, et elle n'est pas intéressée à accepter la responsabilité du financement direct des bourses de déchets; pour elle, c'est au gouvernement à qui il revient en premier lieu d'apporter une aide financière.

À partir de ces constations, trois scénarios ont été retenus en vue d'une analyse ultérieure:

- le gouvernement peut continuer d'apporter une faible aide financière;

- le gouvernement peut apporter une aide financière considérablement accrue, à long terme;

- le gouvernenement peut apporter, à court terme, une aide financière accrue et cédar graduellement la place à l'industrie.

Dans le cas des deux derniers scénarios, les fonds seraient fournis grâce aux programmes existants out à de nouveaux mécanismes.

Le troisième scénario a été jugé préférable aux autres, car il permettait de mieux atteindre les objectifs fixés pour la présente étude. Les principales recommandations se rapportant à ce scénario sont les suivantes:

- un système d'échange de déchets à trois paliers (national, régional et local) devrait être créé;

- le gouvernement devrait assurer le financement du système pour les cinq premières années;

- une fois que le gouvernement se serait retiré, l'industrie devrait assumer la responsabilité du financement de façon que le sytème puisse fonctionner efficacement;

- le financement direct par l'industrie devrait être réalisé grâce à la participation obligatoire de tous les producteurs de déchets dangereux enregistrés;

- les bourses de déchets devraient être obligées de présenter un plan d'entreprise en bonne et due forme et de s'y conformer;

- des conseils consultatifs formés de représentants de l'industrie et du gouvernement devraient être créés pour fournir une orientation à long terme et examiner les activités des bourses de déchets;

- d'autres efforts devraient être déployés afin de trouver des débouchés pour l'échange de déchets et d'autres sources de financement;

- le gouvernement devrait encourager l'échange de déchets comme une solution de remplacement à l'élimination en chargeant des frais pour l'élimination, en taxant les producteurs de déchets dangereux, en accordant des crédits d'implot et en prenant d'autres mesures financières pour les procédés utilisant des déchets dangereux, et en uniformisant davantage les contrôles législatifs.

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PART I - INTRODUCTION AND REVIEW OF METHODOLOGY

1.0 INTRODUCTION

2.0 METHODOLOGY

1.0 INTRODUCTION

PART 1 - INTRODUCTION AND REVIEW OF METHODOLOGY

1.0 INTRODUCTION

1.1 Study Objectives

In November 1987, Acres International Limited was commissioned by the Canadian Council of Resource and Environment Ministers (CCREM) to undertake a review of waste exchange programs in Canada, the United States and overseas. The stated objective of the study was:

> "... to examine the effectiveness of waste exchanges in reducing the quantity of wastes that would otherwise require treatment and disposal and to recommend means of improving their effectiveness in achieving this goal."

A further objective was to identify opportunities that could be used to increase the financial self-sufficiency of waste exchanges. A full copy of the Terms of Reference for this study are contained in Appendix A.

These objectives were accomplished through a review of the current scientific and technical literature and the administration of a survey to 23 waste exchange operations located in Canada, the United States and Europe. Interviews were also conducted with Canadian representatives of government and industry.

On the basis of information collected through this review Acres prepared a series of recommendations which could be used to enhance the effectiveness and financial self-sufficiency of the Canadian waste exchange program.

1.2 Definitions

The following general terms are commonly used to describe the operation of waste exchanges:

i) Passive - a clearinghouse of information regarding the availability of waste materials. Inquiries which are generated by way of the exchange bulletin or newsletter are simply forwarded to the generator or potential user of the waste and the waste exchange plays no role in transfer negotiations.

ii) Active - an exchange that actively attempts to match generators and potential users of waste, by way of listings in the exchange bulletin or through telephone solicitation. Some degree of follow-up is undertaken to encourage the successful transfer of waste materials.

iii) Pro-Active - an exchange that, in addition to providing the above level of service, also offers technical expertise in waste management. Such an exchange may be involved in consulting with industry and recommending methods by which waste output may be cost-effectively reduced or reused.

iv) Broker - a profit-oriented private enterprise that acts as an agent or consultant for a waste generator, receiving either an up-front fee or a commission for wastes that are successfully sold. Such an operation frequently takes control of a waste product prior to its resale. It is conceivable that a waste exchange could operate in such a fashion.

1.3 Study Background

In Europe, where high energy costs and a shortage of raw materials have been significant factors for many years, waste exchanges have been in continuous operation in most countries since the early 1970s. The majority of these exchanges are operated on a non-profit basis by industry associations, commercial magazines and chemical societies. They are generally passive, functioning simply as clearinghouses of information, often restricted to listings of wastes that are specific to a given industry.

Waste exchanges currently exist in West Germany, France, Austria, Belgium, Italy, the Netherlands and Scandinavia. This list is based primarily on information supplied by the European waste exchange operators who were contacted during the study and therefore may be incomplete. With the exception of the French exchanges, which are subsidized during their first year of operation by the Ministry of the Environment, there has been little or no financial involvement by government in any of these operations.

In contrast, most of the waste exchanges in Canada and the United States are sponsored and funded, at least in part, by government. Perhaps due to the relative abundance of resources and the absence, until recently, of strict environmental regulations governing the disposal of hazardous wastes, industry involvement in these exchanges has been minimal.

Also in contrast to the European exchanges, the majority of the existing North American operations have been

established within the last ten years. In the U.S. as many as 40 of the exchanges that were set up in the early 1970s have been shut down, primarily due to lack of funding, a perceived lack of confidentiality, improper management, understaffing and, in some cases, lack of need or interest.

At the present time there are as many as 14 non-profit waste exchanges operating in the U.S., eight of which were contacted during the present study. The status of the remaining American exchanges is unknown since they were not included in the survey and contact with them was consequently outside of the mandate of this study. The exchanges that were contacted were chosen on the basis of their active participation in several national conferences on waste exchange, their geographical location and their inclusion in other recent studies.

In Canada, the Canadian Waste Materials Exchange was established in 1978 by the Federal government and is currently operated by the Ontario Research Foundation. In the past four years it has been joined by provincial exchanges in Ontario, Manitoba and Alberta. In B.C. an experimental exchange, sponsored by the Federal government and the Recycling Council of British Columbia has recently been established. In addition, provincial exchanges are also currently being considered in Quebec and Saskatchewan.

Although most waste exchanges, including each of the Canadian operations, currently publish listings of all types of industrial wastes, increasing focus has been placed on their role in minimizing the volumes of hazardous wastes that have traditionally been disposed of in

landfills and incinerators. Based on the results of a national inventory conducted in 1981, it is estimated that Canadian industry generates more than three million tonnes of hazardous waste each year (Gore & Storrie Ltd., 1982). Seventy-eight percent of these wastes originate in the provinces of Ontario and Quebec, however industries in Alberta and British Columbia also contribute significant amounts. Table 1-1 provides a summary of this inventory.

An earlier inventory of hazardous wastes, based on data describing the geographic distribution and generation rates of major industries rather than an actual survey of waste generators, was conducted for northwestern Canada by Reid, Crowther and Partners Ltd. (1980). The total estimated volumes of waste generated in the four prairie provinces, British Columbia, Yukon and Northern Ontario were considerably lower than those recorded in the Gore and Storrie study, perhaps due to the fact that only wastes requiring treatment and disposal off-site were considered.

Despite this limitation, the study does provide an indication of the source and type of hazardous wastes generated in western Canada, where three of the four provincial exchanges are located. The petroleum processing, chemical and primary metal industries, most of which are located in Alberta and British Columbia, contribute 75% of these wastes. Eighty percent of the hazardous wastes generated in the study area consist of oils, solvents, acids, alkalis, chemicals and metal-bearing sludges, many of which are potentially recyclable.

TABLE 1-1

HAZARDOUS WASTE QUANTITY SUMMARY*

WET WEIGHT

(TONNES PER YEAR)

Province	Chemicals	Metals	Other	Total
Newfoundland	20,145	434	140	20,719
Nova Scotia	59,564	32,769	14,524	106,857
Prince Edward Island	308	96	2	406
New Brunswick	9,208	1,752	35,925	46,885
Quebec	575,460	237,949	138,508	951,917
Ontario	687,272	766,276	151,559	1,605,107
Manitoba	3,404	8,737	17,317	29,458
Saskatchewan	7,048	13,801	9,295	30,144
Alberta	127,985	47,330	40,629	215,944
British Columbia	45,403	147,956	80,066	273,425
Yukon Territory	1			1
Canada Total	1,535,798	1,257,100	487,965	3,280,863

*SOURCE: Gore and Storrie Ltd., 1982

NOTE: Some of the above estimates are now disputed based on more recent estimates made by individual provinces.

Given the changes which are occurring in Canadian economic conditions and regulatory structures, as well as the increasing awareness of the public and private sectors regarding the sensitivity of the environment, the need for the services of waste exchanges will undoubtedly increase in the future. Hopefully, this review of current waste exchange programs will provide some insight into the way in which the effectiveness of these operations can be enhanced to meet this challenge.

1.4 Structure of Report

This report has been structured around four major sections in order to logically present the findings of the review. These sections are as follows:

PART I - INTRODUCTION AND REVIEW OF METHODOLOGY

PART II - REVIEW OF WASTE EXCHANGE OPERATIONS

PART III - REVIEW OF INDUSTRY AND GOVERNMENT PERSPECTIVES

PART IV - DEVELOPMENT OF RECOMMENDATIONS

2.0 METHODOLOGY

2.0 METHODOLOGY

The methodology initially proposed for this study involved four data collection tasks, namely:

- a review of data collected by the Saskatchewan Research Council in their 1986 study entitled "The Development of an Information Data Base and Sub Structure for a 4-Rs Program in Saskatchewan"
- a literature search using key on-line computer databases
- a survey of waste exchanges in Canada, the United States and overseas
- a survey of government waste management branches and industrial associations.

Using the information collected from these sources, a master database describing the organizational structure, operations, financial status, marketing strategies and successes and failures of existing waste exchanges was constructed. Much of the information contained in this database was collected from existing exchanges with the understanding that confidentiality would be maintained and that only aggregate data would be presented in this report.

Following identification of the key requirements for success, several different scenarios were described and recommendations were developed that Acres believes could improve the effectiveness of the waste exchange system in Canada. These recommendations include methods of improving the financial status, defining the appropriate roles of government and industry, and maximizing the use of waste exchanges.

The methods used to collect information for the study are described in more detail in the following sections.

2.1 Saskatchewan Research Council Data

In 1986 the Saskatchewan Research Council (SRC) completed a study describing the need for implementation of a 4-Rs (waste reuse, recycling, recovery and reduction) program in that province. Much of their report centers around the establishment of a framework for the operation of an industrial materials waste exchange. Their study included a survey of 13 of the 14 exchanges in operation in North America at that time, as well as the results of interviews with representatives of the waste management industry in both Canada and the United States.

On the basis of their findings, SRC recommended that the Saskatchewan Department of Environment establish and fund a pro-active waste reduction program that would include a waste exchange. This exchange would publish a bulletin at least four times a year which would contain listings of all waste materials available in the province. They also recommended that the new exchange interact with other North American exchanges and actively pursue contacts with waste generators in order to encourage their participation in the program.

Much of the information contained in the SRC report, including the completed survey forms, was used to supplement the data collected in the present study. Unfortunately the loss of additional SRC research materials prevented a more comprehensive review of the personal contacts and literature sources on which their study was based.

2.2 The Methodology for Operation of a Waste Materials Exchange in Canada

The findings of a second report entitled "The Methodology for the Operation of a Waste Materials Exchange in Canada", which was commissioned by Environment Canada and completed by the Ontario Research Foundation in 1977, was also used as a source of information during the present study. The authors of that report recommended that a national, passive, information-only exchange be established to meet the needs of the Canadian manufacturing and waste management processing industries. The study itself included a survey of 17 waste exchange operators in Europe and North America. On the basis of its conclusions, the Canadian Waste Materials Exchange was established in 1978.

2.3 Literature Review

A major portion of the literature review involved searching through abstracts of studies, publications and articles available on computer databases. The major databases reviewed included the following:

- National Technical Information Service
- Engineering Index
- ABI/INFORM
- Management Contents
- PTS PROMT
- ELIAS
- OON

The results of these searches are presented in Appendix B. Since ENVIROLINE had already been searched by the SRC, it was not included in our review.

In addition to the computer search, several other databases including Pollution Abstracts and the Applied Science and Technology Index were also reviewed.

As a result of the search of computer databases and major libraries in both Vancouver and Ottawa, a small number of publications and journal articles were found which provided useful information on the operation of waste exchanges. These are listed in Appendix C. Of particular relevance were the articles contained in the proceedings of the four National Conferences on waste exchange.

2.4 Survey of Waste Exchanges

The major vehicle used for collecting data for this study was a survey of waste exchanges in Canada, the United States and Europe. A total of 23 questionnaires were mailed out, and 20 responses were received. Table 2-1 outlines the results of the survey. A list of waste exchanges contacted in the survey is included in Appendix D.

Fourteen completed questionnaires were received. Based on follow-up telephone calls we have established that four of the exchanges have gone out of business and two are not yet in operation. The Southern Waste Information Exchange in Florida sent promotional material rather than

TABLE 2-1

RESULTS OF SURVEY OF WASTE EXCHANGES

Waste Exchange	Location	Response Received	No Response	Closed	Not Running Yet
Alberta Waste Materials Exchange	Edmonton, AB	X			
British Columbia Waste Exchange	Vancouver, BC		X		
Biomass Energy Institute	Winnipeg, MB	X			
Canadian Waste Materials Exchange	Mississauga, ON	X			
Ontario Waste Exchange	Mississauga, ON	X			
Peel Regional Waste Exchange	Brampton, ON				X
Direction de la Recuperation et du Recyclage	St. Foy, PQ				X
Borse fur Weiterverwertbare Chemie-Abfalle	Switzerland			X	
Bourse des Dechets Industriels de Haute-Normandie	France	X			
Deutscher Industrie-und Handelstag	West Germany	X			
Handelskammer Oberosterreich	Austria	X			
American Chemical Exchange	Skokie, IL		X		
California Waste Exchange	Sacramento, CA	X			
Great Lakes Regional Waste Exchange	Grand Rapids, MI	X			
Indiana Waste Exchange	Indianapolis, IN	X			
Industrial Material Exchange Service	Springfield, IL	X			
Industrial Waste Information Service	Columbus, OH			X	
Midwest Industrial Waste Exchange	St. Louis, MI			X	
Montana Industrial Waste Exchange	Helena, MT	X			
Northeast Industrial Waste Exchange	Syracuse, NY	X			
Southeast Waste Exchange	Charlotte, NC	X			
Southern Waste Information Exchange	Tallahassee, FL	X			
Western Waste Exchange	Tempe, AZ			X	
	TOTALS	15	2	4	2

a survey response and no response was received the B.C. Waste Exchange.

The questionnaire that was sent to the waste exchanges was 15 pages in length and contained 48 questions covering such subject areas as organization, technical expertise, operations, finance, marketing and key successes/failures. A copy of the questionnaire is contained in Appendix E.

After the questionnaires had been delivered to the waste exchanges, follow-up telephone calls were made to answer questions and ensure that the completed forms were returned to the Consultant. Following a review of the survey response, waste exchanges were recontacted by telephone, when necessary, and asked to provide additional information or clarifications.

2.5 Survey of Government and Industry

In order to ensure that all interested parties had input into the study, telephone interviews were conducted with representatives from Canadian industry and government.

A total of nine industry associations were contacted by telephone. The contact list for these associations is contained in Appendix F.

A copy of the questionnaire utilized during these interviews is contained in Appendix G.

Interviews were also undertaken with representatives of provincial waste management branches who were asked to

discuss current waste management programs, government initiatives with respect to waste exchanges and the role and the future of waste exchanges. The contact list for government representatives is included in Appendix F.

Although some very useful information was received from these industry and government sources, in general their responses indicated a lack of direct contact or familiarity with waste exchanges. Although somewhat disappointing, this type of response did provide an important insight into the level of effectiveness currently achieved by most North American exchanges.

PART II - REVIEW OF EXISTING EXCHANGE OPERATIONS

3.0 ORGANIZATIONAL STRUCTURES

4.0 OPERATIONS OF WASTE EXCHANGES

5.0 FINANCIAL STATUS

6.0 MARKETING

7.0 LEGISLATION

3.0 ORGANIZATIONAL STRUCTURES

PART II - REVIEW OF EXISTING EXCHANGE OPERATIONS

3.0 ORGANIZATIONAL STRUCTURES

3.1 Organizational Structure

In Europe, most waste exchanges are operated by Chambers of Commerce which, in addition to funding, provide a low cost infrastructure and access to a large number of contacts within industry. This access is particularly widespread in West Germany where membership in the local Chamber of Industry and Commerce is a legal requirement for all industries and businesses. In Austria, the Federal Waste Exchange Board, organized by the Upper Austrian Chamber of Commerce, coordinates the tasks of the smaller provincial exchanges and is responsible for wastes which qualify for long-distance transportation because of their quantities, qualities and values. In France, the activities of the 16 regional exchanges are promoted by the Ministry of Environment through the Agency for the Recovery of Wastes (ANRED). The primary sources of funding for these exchanges are however, the regional Chambers of Industry.

In North America, most of the exchanges contacted in this survey have some type of involvement with government. Direct support, for example, is provided by the Federal government and by most of the provincial governments for the operation of the Canadian Waste Materials Exchange. Similarly, in the United States, the Northeast Industrial Waste Exchange, operated by a 12 State regional planning board, receives both Federal and state funding. Government involvement is greatest in California where

the waste exchange is run as part of the State Department of Health Services.

In several instances, government provides only partial support for waste exchanges. In Ontario, the Ministry of Environment provides half of the funding for the provincial exchange; the remainder comes from the Ontario Waste Management Corporation. In Illinois, the Environmental Protection Agency shares the costs of the Industrial Materials Exchange Service with the State Chamber of Commerce.

In other cases, exchanges are operated under contract to private firms or research institutes (e.g., Indiana Waste Exchange, Alberta Waste Exchange, Manitoba Waste Exchange) or are sponsored by a university (e.g., Southeast Waste Exchange, Southern Waste Information Exchange). State Chambers of Commerce are involved in the operation of waste exchanges in Montana, Illinois and Florida.

3.2 Objectives

The 14 surveyed waste exchanges identified three main operational goals or objectives. These goals involve the provision of a program designed to encourage:

- cost-effective waste management
- transfer of information, and/or
- minimization of hazardous wastes.

There was some variability within each of these categories and in several instances an exchange identified

both short and long term objectives that encompassed each of these goals.

The short term goal of the Great Lakes Regional Waste Exchange, for example, is to help guide small to medium-sized industries towards a more cost-effective strategy for proper waste management. In the long run however, they would like to provide industry with a total waste management package including information on environmental regulations, technological developments and appropriate products and services.

With regard to assistance with cost-effective waste management, several other exchanges, including the Northeast Industrial Waste Exchange, expressed a desire to help industry minimize the cost of waste disposal while promoting market acceptance of potentially recyclable industrial by-products.

Since many of the exchanges are primarily involved in providing listings of waste materials, an obvious objective for them is exchange of information. The goal of the Southeast Waste Exchange, for example, is 'to increase industry's awareness of the exchange as a safe, economical waste management option, and to provide business with a central source of information on regulatory issues, training resources and waste treatment technologies'. Similarly, the Manitoba Waste Exchange seeks to provide a coordinated framework in which waste recycling transactions can be facilitated and recycling and waste reduction can be promoted.

The objective of the Alberta Waste Exchange is to develop a computerized database of listings for wastes wanted

and/or available, as well as for related services. The objective of the Canadian Waste Materials Exchange is to help industry manage its wastes and to assist the Federal and provincial governments in their mandate to protect the environment.

Although all exchanges were similarly concerned with reducing the volume of wastes by keeping as many waste materials as possible in production, two (California and Ontario) cited management of hazardous wastes as a specific priority. Other exchanges may also have had this objective in mind, however they did not specifically mention it.

The Montana Waste Exchange described the provision of information on hazardous waste management as one of their objectives. In reality this exchange handles very few hazardous listings.

3.3 Geographical Area Served

The geographical area served by each of the exchanges depends to a large extent on the size of the surrounding industrial base. It also depends on the exchange's financial resources, level of staffing and mode of operation.

The geographical area served by each of the waste exchanges surveyed in this study fall into two distinct categories:

- provincial/state
- regional/national

Table 3-1 describes the jurisdiction of each of these exchanges.

According to the responses received in the survey, several larger exchanges, including the Canadian Waste Materials Exchange, Industrial Materials Exchange Service, the Southeast Waste Exchange and the Southern Waste Information Exchange receive listings and inquiries from industry throughout North America and Puerto Rico and from overseas countries including Japan, the Phillipines and India. Most operations contribute some or all of their listings to other exchanges in order to achieve national or international distribution. The area served by these and other waste exchanges will undoubtedly continue to expand as a result of increased use of networks of computerized databases.

Through a special working group of the Economic Commission for Europe of the United Nations (ECE), the West German Exchange coordinates the activities of all the European waste exchange boards. It publishes a special bulletin containing listings from West Germany, Austria, Switzerland, Italy and France.

3.4 Passive vs Active Exchanges

The majority of surveyed waste exchanges describe their mode of operation as active or pro-active rather than passive. This was particularly true of the exchanges that operate over a relatively small geographical area such as at the provincial or state level. With the exception of the Montana Waste Exchange, each of the small exchanges (Table 3-1) was described as active.

TABLE 3-1

GEOGRAPHICAL AREA SERVED

Waste Exchange	Area Served
I Province/State	
Montana Industrial Waste Exchange	• Montana
Ontario Waste Exchange	• Ontario
Alberta Waste Materials Exchange	• Alberta
California Waste Exchange	• California
Bundes-Abfallborse	• Upper Austria
Bourse des Dechets Industriels	• Upper Normandy
II Wider Region	
Canadian Waste Materials Exchange	• Canada
Great Lakes Waste Exchange	• US EPA Region V - Great Lakes Region
Northeast Industrial Waste Exchange	• US Northeast - 12 States
Industrial Materials Exchange Service	• US Midwest
Abfallborse, West Germany	• West Germany & Europe
Indiana Waste Exchange	• US Midwest
Manitoba Waste Exchange	• Manitoba/Saskatchewan/Northwest Ontario
Southeast Waste Exchange	• US Southeast - 9 States
Southern Waste Information Exchange	• Southern US

The Montana exchange attributed its use of the passive mode of operation to the general lack of hazardous wastes within that state. Apparently the operators of this exchange do not feel that the recovery and reuse of non-hazardous materials warrants the extra effort that would be required to run an active exchange.

The operators of the five other provincial or state exchanges agreed that an active approach was necessary in order to increase the profile of their exchange in the eyes of industry. They also felt that an active approach involving personal follow-up on listings inquiries was essential to the promotion of potential exchanges. For example, by providing technical information or advice on regulatory procedures, an exchange operator can often influence the success of negotiations between a generator and potential user.

A few of the provincial or state exchanges made a distinction between the active and pro-active modes of operation, explaining that financial constraints limited their activities to the former category.

The Ontario Waste Exchange relies on the listings bulletin published by the Canadian Waste Materials Exchange and as a result its operators can spend more time actively promoting actual exchanges.

Five of the larger regional or national exchanges describe their operations as active or, in at least one case, pro-active.

An active effort is required by the Manitoba Waste Exchange, for example, in order to locate companies that

are willing to take materials for which there is no existing market. Telephone contact is used to effect more rapid exchanges than would occur simply from referral to the exchange's listings bulletins. Telephone contact is also used to follow-up on potential transactions between companies.

The Southeast Waste Exchange also coordinates the transfer of wastes over the telephone, arranging for exchanges of materials that have not been listed in their catalog. In contrast to the Manitoba Exchange however, the Southeast Exchange is a pro-active operation. Through its affiliation with the Departments of Chemistry and Civil Engineering at the University of North Carolina, and the participation of an advisory board made up of representatives from industry, government, educational institutions and community groups, this exchange is able to offer a comprehensive community outreach program involving meetings with business, environmental and government representatives throughout the southeastern United States.

The four remaining large exchanges describe their modes of operation as passive. The reasons for choosing this mode varied. For example, in West Germany where the waste exchange is run by the Chambers of Industry and Commerce, waste listings are simply published in the Chambers' monthly bulletins. No further effort is made to promote successful transactions. The Great Lakes Regional Waste Exchange operates in a passive mode due to lack of manpower and sufficient financial support. The contract which the operators of the Indiana Waste Exchange have with the State stipulates the use of this mode. And in Canada, the passive mode was considered

appropriate for the Canadian Waste Materials Exchange when it was chartered in 1978 because it was designed to operate at a national level and it was felt that as a consequence its broad base of listings would have made an active approach unnecessary.

3.5 Successes, Problems and Suggestions

3.5.1 Successes

Several waste exchange operators noted that, in contrast to private, broker-type operations, their non-profit status and government sponsorship allows them to pursue potential exchanges involving small quantities of wastes or materials with no recognized market value. Many such wastes have been successfully transferred as a result of efforts undertaken by these waste exchanges.

Many operators felt that they were also being successful in meeting their objective of providing industry with cost-effective waste management alternatives.

3.5.2 Problems

Most respondents felt that their inability to operate at a pro-active level seriously hampered their efforts to maximize the number of exchanges occurring within their jurisdiction.

3.5.3 Suggestions

The opportunity to work at a pro-active level would ultimately increase the ability of a waste exchange to become self-sufficient.

4.0 OPERATIONS OF WASTE EXCHANGES

4.0 OPERATIONS OF WASTE EXCHANGES

4.1 Level of Staffing

With the exception of the large regional exchanges such as the Southeast Waste Exchange, the Northeast Industrial Waste Exchange and the Industrial Materials Exchange Service, and the California Waste Exchange which serves a wide industrial base within its State, most operations depend to a large extent on part-time employees (See Table 4-1). Six exchanges have no full-time staff. The large exchanges, in contrast, have between three to five full-time employees as well as, in the case of the Southeast Waste Exchange, up to 15 part-time employees, hired for the duration of specific research projects.

In Canada, with the exception of the Ontario Waste Exchange which has one full-time and four part-time positions, all operations are run by one or two part-time employees.

Similarly, two part-time employees run each of the regional French exchanges and the German exchange. In the latter case the preparation of the listings bulletins represents only one component of the overall duties of Chamber of Commerce employees. In Austria, the Bundes-Abfallborse is operated by one full-time and one part-time employee.

Most employees of waste exchanges have a university education based in chemical, biological or environmental science or in engineering. Several have economic, administrative, communication and/or educational

TABLE 4-1

LEVEL OF STAFFING

Waste Exchange	Part-time	Full-time
I Europe		
Bundes-Abfallborse (Austria)	1	1
Bourse des Dechets Industriels (France)	2	-
Abfallborse, West Germany	2	-
II Canada		
Canadian Waste Materials Exchange	2	-
Ontario Waste Exchange	4*	1
Manitoba Waste Exchange	1	-
Alberta Waste Materials Exchange	2	-
III United States		
California Waste Exchange	-	5
Great Lakes Waste Exchange	2	1
Industrial Materials Exchange Service	-	3
Indiana Waste Exchange	3	1
Northeast Industrial Waste Exchange	-	3
Southeast Waste Exchange	2*	3

* Number of part-time employees varies depending on size of research project being undertaken by waste exchange.

expertise. A few also have many years of practical experience in the field of waste management.

None of the waste exchanges that responded to the survey takes advantage of government sponsored job creation or training programs. At least three, however, do provide some level of training for their staff. The majority of respondents cited waste management conferences and seminars as their primary source of on-going specialized training.

4.2 Technical Expertise

When asked to describe their source of technical expertise, the majority of waste exchange operators cited in-house services. These services are usually supplemented however, by ad hoc technical support provided by government agencies, industry and/or waste management consultants. Two of the American exchanges have close ties with a local State University which also provides support and guidance. One of these, the Southeast Waste Exchange, has a board of advisors, which as previously mentioned, includes representatives from industry, government, university and community groups. This board provides technical assistance as well as suggestions regarding useful programs and services and potential sources of funding.

The Alberta Waste Exchange interfaces directly with the National Research Council's Industrial Research Assistance program and therefore refers all technical questions to that organization. Similarly, the Manitoba Exchange refers waste management inquiries to the provincial Ministry of Environment, Workplace Safety and

Health or the Manitoba Research Council's Industrial Technology Centre.

Several operators acknowledged the role played by seminars and conferences, particularly the annual National Conference on Waste Exchange, as well as contacts with other exchanges, in providing relevant up-to-date technical information.

4.3 Research Activities, Educational Programs and Technical Services

The extent to which a waste exchange participates in or initiates outside activities is generally dictated by levels of staffing, technical expertise and financial support. Even the majority of passive exchanges however, reported that they have been involved in the organization of educational programs and the provision of some measure of technical assistance. One-third of all surveyed exchanges also undertake research programs.

The type of educational programs offered by waste exchanges varies and can include:

- publication of articles on waste management
- presentations made at meetings of industry and at trade shows
- organization and hosting of workshops, seminars and conferences.

The Montana Industrial Waste Exchange, for example, recently co-sponsored a 10-city seminar series for small waste generators in order to advise them of the implications of amendments to the Federal Resource Conservation and Recovery Act (RCRA). The Industrial Materials

Exchange Service also recently sponsored a conference which was organized to educate manufacturers about the use of biodegradeable, photodegradable and recyclable plastics. Several exchanges, including this year, the Canadian Waste Materials Exchange, have been involved in the organization of the annual National Conference on Waste Exchange.

Technical assistance programs generally involve the provision of services regarding:

- waste minimization, treatment and disposal
- new technological developments in waste management
- interpretation and application of regulations governing waste management
- referral to other agencies

The Great Lakes Regional Waste Exchange, for example, provides assistance to industry in the interpretation of new legislation as well as information regarding the availability of support services offered by government, brokers, recyclers, carriers, laboratories and consultants. Similarly, the Manitoba Exchange is currently compiling a directory of waste services available to Manitoba Industry.

The Ontario Waste Exchange is one of the few operations that organizes plant visits for companies that are interested in becoming involved in the exchange and that require on-site assessment of their waste streams.

Several survey respondents are involved in assisting other organizations to set up new waste exchanges. Through a series of meetings with government, industry

and university groups, the Southeast Waste Exchange recently helped the University of Alabama and the Alabama Energy Department to set up an exchange in that State. In Europe, the special working group of the ECE, led by West Germany, has published a handbook which gives practical tips for the establishment and operation of waste exchange boards.

Several exchanges undertake programs of research in the field of waste management. The Ontario Waste Exchange, for example, carries out mini-research projects on selected waste streams in an effort to find ways of maximizing the reuse potential of certain industrial by-products.

The Southeast Waste Exchange has recently completed two studies involving the documentation of types and amounts of hazardous wastes being generated in North and South Carolina. This information will in turn be used to develop marketing strategies that will encourage industrial reliance on waste exchange services.

4.4 Qualitative Assessment of Listings, Inquiries and Transfers

In Canada, waste materials are classified in 10 categories for 'wastes wanted' and 'wastes available' (see Appendix H-1). The American system initiated in 1984, is based instead on 11 classifications (Appendix H-2). It is anticipated that the Canadian exchanges will begin to separate their 'organic chemicals and solvents' listing in the near future in order to conform to the American system and to facilitate the transfer of listings between the two countries via computerized databases.

In West Germany, the Abfallborse uses a classification system that consists of 10 categories (Appendix H-3). In contrast to the North American systems, this exchange includes a category for glass while omitting categories for acids, alkalies, solvents, oils and waxes, wood and metal-bearing sludges. The Austrian Exchange, on the other hand, lists a total of 19 categories including domestic and agricultural wastes, stone, earth and ashes and mineral and vegetable oils (Appendix H-4). Although there is no common European classification system at the present time, the special working group of the ECE is attempting to develop one in order to facilitate trans-border exchanges.

Table 4-2 provides a breakdown of the percentage of hazardous materials included in the listings, inquiries and successful exchanges recorded by eight survey participants. The West German exchange did not provide this information and neither the Indiana Waste Exchange or the Industrial Materials Exchange Service in Illinois attempt to categorize their wastes in this manner, due in large part to the complex and changing definition of hazardous waste contained within American environmental legislation. The Alberta Waste Exchange is currently in the process of compiling this type of information.

In California, non-hazardous wastes are the responsibility of the State Waste Management Board, rather than the Department of Health Services which operates the waste exchange. Therefore, this exchange only accepts listings for hazardous materials. Conversely, in France the regional waste exchanges only handle non-hazardous wastes.

TABLE 4-2

ESTIMATED PERCENTAGE OF NUMBERS OF LISTINGS, INQUIRIES AND EXCHANGES INVOLVING HAZARDOUS WASTES

	Listings (% Total)	Inquiries (% Total)	Transfers (% Total)
Canadian Waste Materials Exchange	45	45	50
Ontario Waste Exchange	80	60	85
Manitoba Waste Exchange	60	30	36
Great Lakes Regional Waste Exchange	42	60	?
Montana Industrial Waste Exchange	10	?	?
Northeast Industrial Waste Exchange	70	?	?
Southeast Waste Exchange	60	?	?
Austria-Bundes-Abfallborse	22	15	5

Of the waste exchanges which could provide a breakdown of their listings, several, including the Montana Industrial Waste Exchange and the Northeast Industrial Waste Exchange, indicated that the success of their operations was dependent on non-hazardous listings. The Manitoba Waste Exchange also experiences a considerable level of interest by industry in its non-hazardous listings, however given the limited markets for many of these materials, aside from metals, the exchange must also rely on its hazardous listings.

In 1986, exchanges involving hazardous wastes such as acids, alkalies and solvents accounted for 80% of the transfers arranged through the Southeast Waste Exchange, on a one-time cost-benefit basis. On an on-going cost-benefit basis however, the importance of non-hazardous materials such as plastics, rubber, textiles and leather increased to approximately 35%. Similarly, exchanges involving plastics accounted for 72% of the on-going cost-benefits recorded by the Industrial Materials Exchange Service in 1986.

According to the Canadian Waste Materials Exchange most successful transfers of available wastes in this country, in terms of tonnage/year, have involved oils, fats and waxes (30.5%), wood and paper products (29.5%) and metals and metal-bearing sludges (5.8%). The Canadian Waste Materials Exchange is unique in providing special listings for laboratory chemicals. All materials listed within this category up to 1987 have been transferred, representing 21% of the operation's successful exchanges.

4.5 Geographical Assessment of Listings, Inquiries and Transfers

As noted in Section 3.3 - Geographical Area Served, several exchanges handle listings and inquiries which originate outside their jurisdiction. Two of these operations provided information regarding the distance over which successful transfers of waste materials have occurred.

According to information provided by the Canadian Waste Materials Exchange, the geographic breakdown of listings, inquiries and transfers reflects the distribution of industry across Canada. Likely due to the concentration of industry in Ontario and the proximity of the waste exchange, 57.2% of its listings and 61.6% of its inquiries originate in that province. Approximately 70% of all successful transfers also occur there.

Table 4-3 provides an analysis of the distance traveled by wastes transferred through the efforts of the Canadian Waste Materials Exchange since 1978. Approximately 20% of the firms contacted by this exchange cited distance as a primary reason for breakdown of transfer negotiations.

The Industrial Materials Exchange Service accepts listings from the United States, Canada and Puerto Rico. In 1986, 50% of their listings originated in Illinois. Thirty-two percent originated in the neighboring states of Indiana, Iowa, Minnesota, Missouri and Wisconsin. A few came from as far away as California. Inquiries regarding these listings were received from 37 states, Canada and Puerto Rico. The majority of successful transfers (54%) however, were completed within Illinois.

TABLE 4-3

ANALYSIS OF DISTANCE TRAVELED BY WASTES TRANSFERRED*

		% of those Stating Distance
< 50 miles	150	36.5
50 to 100 miles	42	10.2
100 to 200 miles	38	9.2
200 to 500 miles	142	34.6
500 to 1000 miles	17	4.1
> 1000 miles	22	5.4
Did not state	108	-
	519	100.0

* SOURCE: Canadian Waste Materials Exchange, September 21, 1987

With the exception of a single transaction involving the transportation of 13,400,000 gallons of waste alkalies valued at $1,273,000, 800 miles from Kansas to Georgia, no information is given concerning the relationship between the value of the waste and the distance it may be transported in order to effect a successful exchange. There is no apparent relationship between the quantity of waste and the distance over which it may be transferred in order to effect an exchange. Some wastes do however, travel great distances, supporting the need for large regional or national exchanges and/or the importance of networking among smaller, more localized operations.

4.6 Monitoring the Effectiveness of Waste Exchanges

Seventy-five percent of survey respondents do attempt to measure their success, although only 60% do so within the framework of an implementation plan. The success of an exchange is generally assessed either in terms of internal or external characteristics. Some exchanges also solicit feedback from their users. Internal characteristics may include total number of listings and/or inquiries per listing, or the annual increase in the circulation of the exchange bulletin.

The number of successful transfers is often used in conjunction with estimates of tonnage or volume, replacement value of raw materials and/or deferred disposal costs to provide an external measure of an exchange's success.

When using such external criteria to monitor the success of an exchange it is important that the age of the exchange be taken into consideration. In the first few

years of operation most exchanges experience a relatively high rate of successful transfers. Once a waste generator and user have been matched, however, the transfer of materials may be on-going and there is no longer any need to list with the exchange. In addition, as the most marketable items are removed from the list the potential for transfer of the remaining items declines.

More than 90% of respondents found that once a match had been found between a waste generator and a user, the waste exchange was bypassed in all future on-going transactions between the parties. The Austrian Exchange, for example, estimates that as many as 80% of the waste transactions occurring in their area now take place outside their jurisdiction.

In its first four years of operation the Canadian Waste Materials Exchange experienced a 15% success rate based on the ratio of number of transfers to total wastes listed. Approximately 290,750 tonnes of waste materials were exchanged as a result of efforts undertaken by the Canadian Waste Materials Exchange in 1987/88. This estimate includes materials exchanged in new transactions as well as those which are ongoing between companies that were originally matched by the Exchange. Approximately 45% of the wastes that are involved in these transactions are hazardous (B. Laughlin, C.W.M.E., pers. comm., 1987). The total value of all new and ongoing exchanges in that year was estimated to have exceeded $11 million. Therefore, despite the fact that the number of transactions and the tonnage of wastes transferred per year in these transactions have apparently declined in recent years, this exchange's contributions to industry and the community in finding new matches and in educating the

public and industry about recycling are very valuable and consequently should also be used to measure its success.

From 1986 to 1987, the Canadian exchange was responsible for initiating $1 million in waste transfers, based on replacement values (B. Laughlin, C.W.M.E., pers. comm., 1987). Although the method of valuing transferred wastes varies among exchanges, this figure compares favorably to the value attributed to waste transfers initiated by large American operations such as the Northeast Industrial Waste Exchange. Other regional U.S. exchanges, however, such as the Industrial Materials Exchange Service, appear to be much more successful. Based on overall cost benefits, including replacement values and transportation and deferred disposal costs, this exchange was responsible for initiating over $7 million in transfers in 1985 and 1986.

Three of the Exchanges that we attempted to contact during the survey have been shut down as a result of a similar decline in the number of successful transactions. These included the Borse fur Weiterverwertbare in Zurich, Switzerland, the Midwest Industrial Waste Exchange in St. Louis, Missouri and the Industrial Waste Information Exchange in Columbus, Ohio. The latter operation was closed five years ago when it became apparent that the companies who at one time had used the Exchange were now bypassing it and making direct contact with each other. Markets for all re-usable waste products available within its jurisdiction had been established during its five years of operation. The operators of this exchange felt that their long term success was hampered by their limited geographic base which consisted of only seven county's in central Ohio. Local participation in the

exchange was not extensive enough to warrant such an operation.

All surveyed Exchanges described their operations as being successful to a greater or lesser degree, however the data they provided was generally too vague to permit us to make objective conclusions in this regard.

Nine respondents provided enough information regarding numbers of listings, inquiries and successful transactions to enable us to measure their growth or decline. Five of these Exchanges have recently experienced large increases in each of these criteria.

For example, the Southeast Waste Exchange recorded a 33% increase in listings, a 71% increase in inquiries and a 137% increase in successful transfers between 1985 and 1986. Details of this information are included in the profile of this exchange's operations in 1986/87 which is presented in Appendix I.

The Northeast Industrial Waste Exchange experienced an almost 300% increase in the number of inquiries received between 1986 and 1987, with a near 50% increase in the number of listings. On a smaller scale, the Alberta Waste Exchange experienced a 24% increase in the number of inquiries received between 1986 and 1987, with a 12% increase in the number of listings.

For two exchanges which showed either stability or growth in number of inquiries and listings, tonnage of transferred materials declined by as much as 90% while the value of these goods remained relatively steady. Depending on how this value was estimated, this may reflect a trend

toward exchanges involving only the most valuable materials. Alternatively, it may reflect the high or increasing costs of disposal for wastes exchanged in recent years.

4.7 Methods of Improving the Ratio of Exchanges to Inquiries

Based on a follow-up on inquiries regarding bulletin listings, the Canadian Waste Materials Exchange was able to analyze the responses given by companies who were questioned about their inability to complete a successful transaction. In the majority of cases (49.6%) the waste material did not meet the technical requirements of the potential recipient. Other explanations for unsuccessful transactions included:

- distance (20.4%)
- cost (15.1%)
- other (14.9%)

Most survey respondents agreed that a more pro-active approach would permit them to increase the success of their operations particularly in terms of ensuring waste transfers. The ability to follow-up on listing inquiries would allow them to obtain useful information regarding transportation factors and costs and to more effectively link waste generators with specific users. The operator of the Northeast Industrial Waste Exchange feels that more funding would increase the efficiency of his program and enable him to hire technicians who could actively pursue potential transfers rather than forcing him to rely so heavily on the listings bulletin.

The Industrial Materials Exchange Service noted that the chance of a successful transfer being completed increased with the amount of information used to describe the waste in the listings bulletin. Of particular importance in this regard is information concerning the frequency with which the waste is generated and details regarding its chemical composition.

4.8 Successes, Problems and Suggestions

4.8.1 Successes

With respect to operations, examples of successful achievements included the ability to:

- generate the recent dramatic increase in level of interest by industry in waste exchange services
- initiate transfers of waste materials, in many cases valued at more than $1 million/year
- provide technical assistance and advice due to close affiliation with government, industry and/or educational institutions
- develop a computerized listings database for more efficient retrieval and updating.

4.8.2 Problems

Problems identified by the surveyed waste exchanges included:

- low levels of staffing which hamper effectiveness of exchange programs
- inability to identify and quantify volumes of wastes, initially listed with the exchange, that are now being transferred on an on-going basis outside of the exchange program.

The latter problem results in an inability to measure the level of success attained by a waste exchange, particularly over time as the importance of these on-going transfers increases and the level of interest in the exchanges declines.

4.8.3 Suggestions

Waste exchange operators are almost unanimous in their desire to hire more staff. Most would also like to be able to maintain an up-to-date database describing their operations as well as the identity of generators and potential users, professional recyclers and waste management consultants.

Both of these suggestions would require a higher, more secure level of funding than that which is currently enjoyed by most waste exchanges.

5.0 FINANCIAL STATUS

5.0 FINANCIAL STATUS

The review of the financial status of the surveyed waste exchanges is limited by the lack of information available. The two key factors which account for this problem are:

- several exchanges refused to provide the information, as it is considered to be confidential
- several respondents were unaware of their actual operational costs because the exchange is run as part of a larger organization or government department that supplies staff, office space and/or other services.

It is also believed that in some instances where this data is provided, the levels of costs shown are below the true levels.

Of the 14 responses received, seven contain relatively complete cost and revenue information. Most exchanges however, offered comments regarding methods of improving financial self-sufficiency and securing additional funding.

5.1 Operating Costs

For the seven exchanges that provided this data, annual operating costs ranged from approximately $20,000 to $190,000. In the majority of cases the annual operating costs were less than $60,000.

Table 5-1 outlines the distribution of costs by cost category for the waste exchanges that provided this information. Although, there is a great deal of

TABLE 5-1

DISTRIBUTION OF OPERATING COSTS

(%)

Category	High	Low	Average
Salaries	67	32	55
Rent	29	4	10
Office Costs	13	2	10
Subgroup	94	45	75
Printing	22	6	15
Postage	33	5	9
Other	5	0	1
Subgroup	55	6	25

variation within these categories among exchanges, the averages are quite representative of all operations.

The implication of these figures is that once salaries, rent and office costs are paid, approximately 75% of the budget has been consumed. Assuming an operating budget of $60,000, this leaves only $15,000 for printing, postage and other marketing expenses. As a result, and as shown later, most waste exchanges can only afford to publish an information bulletin as a means of promoting their service. Very little cash is left for other marketing programs.

5.2 Current Funding

With the exception of the European waste exchanges, most funding is provided by state, provincial or Federal governments. In some instances academic institutions subsidize exchange operations and in others fee revenue is earned. Governments and crown corporations however, provide, on average, approximately 90% of total funding.

An exception to this rule is the Southeast Waste Exchange. Although this exchange is subsidized by the University of North Caroline it generates most of its revenues by successfully out-bidding other non-profit organizations for Federal, State and private sector research grants.

A second exception is the California Waste Exchange, for although it is government operated, its funding mechanism is very different from that of other exchanges. Funding is generated from a tax levied against hazardous waste generators.

In contrast to the North American exchanges, the European exchanges, are funded by the Chambers of Commerce. Because they represent only one of the services offered by the Chambers in their overall member programs they may not have a set budget and so it is difficult to determine the actual level of funding they receive and to identify individual operating cost components.

Only six of the exchanges contacted during the survey currently charge fees for the services they provide. Five of these exchanges charge a fee for placing a listing in the exchange bulletin; four charge an annual subscription fee for companies who do not list materials in the bulletin. In some cases fees are also collected for research projects and educational programs.

The waste exchange operators agreed almost unanimiously that current revenues received were <u>not</u> sufficient to operate their exchanges at an effective level. While most exchanges could not identify an absolute shortfall between actual and desired funding levels, they agreed that any further monies should be utilized to hire new staff, increase the level of promotional activity and initiate a more pro-active approach to waste exchange.

At least one operation, the Western Waste Exchange in Tempe, Arizona has recently been closed due to lack of funding.

5.3 Financial Viability

A large number of suggestions were received regarding ways in which the financial viability of waste exchanges could be improved. These included:

- charge user fees
- provide more services for fees
- allow commercial advertising in the bulletins
- seek funding from municipalities with waste reduction programs
- seek support from industry
- convince government to provide a base level of funding in order to provide stability and to gain the support of industry.

Two of the larger, more successful exchanges, the Northeast Industrial Waste Exchange and the Industrial Materials Exchange Service, had some interesting comments. The Northeast Industrial Waste Exchange felt that exchanges will never be totally financially self-sufficient, particularly when they operate passively. This observation is consistent with comments received from other operators who feel that a base level of funding is required to provide stability and credibility for their exchange.

The Industrial Materials Exchange Service identified what appears to be a key factor in the lack of industrial support for and the low level of participation in waste exchange programs. The operators of this exchange believe that business (and perhaps government) has yet to fully appreciate the social, environmental, economic and

financial benefits that may accrue from the use of waste exchanges. In their view, this attitude in turn necessitates continued government support for exchange operations.

None of the exchanges saw any potential for obtaining bank financing due to the non-profit nature of their business.

A common complaint of the exchanges was that an inordinate amount of time had to be dedicated to justifying existing levels of funding and to seeking additional sources of financial support. Most felt that future government support was uncertain at best, and that maintaining this funding required the dedication of a substantial amount of time.

5.4 Successes, Problems and Suggestions

5.4.1 Successes

Despite the perceived underfunding of waste exchanges in North America, most operators feel they have been successful in a number of areas:

- ability to hire well-motivated staff
- collection of additional revenues through outside activities (e.g., seminars)
- ability to increase the level of interest in their operations within industry.

5.4.2 Problems

The key problems with respect to funding are echoed by virtually all of the exchanges and include:

- inadequate operating budgets
- small promotional budgets
- lack of long-term financial support.

5.4.3 Suggestions

The key suggestions received from the waste exchanges with respect to funding include:

- provide additional government support, at least to a base level
- seek financial support from industry
- seek municipal support
- create a dedicated 'Waste Exchange Trust' to provide on-going funds for basic functions and services.
- charge fees for listings in the exchange bulletins
- develop a commercial advertising schedule for the bulletins
- charge user fees for technical advice and services

6.0 MARKETING

6.0 MARKETING

Marketing is one of the most important activities influencing the success of a waste exchange. Unfortunately, although several exchanges identified the development of a marketing strategy as a priority, most are unable to pursue this activity due to inadequate levels of funding and staffing. The Southeast Waste Exchange is an exception to this rule. In 1985 and 1986 they completed three marketing campaigns including an outreach program to industries in North and South Carolina and the stimulation of industrial recycling initiatives throughout the southern United States. The findings of these studies were used to develop a comprehensive management plan for that exchange.

6.1 Methods of Promotion

When survey respondents were asked what methods of promotion they use to market their waste exchange, the following information was provided:

Method	Waste Exchanges Utilizing	Waste Exchange Rating "Most Successful"
Bulletin	15	1
Seminars	11	2
Journals	11	4
Brochures	10	4
Conferences	10	1
News Media	8	0
Education Programs	4	0
Networking	4	1
Slide Shows	2	0
Word of Mouth	2	2
Personal Contact	2	2
Free Advertising	2	1
Yellow Pages	1	1

Each of the waste exchanges surveyed during this study publishes a listings bulletin. Only one however, the Southeast Waste Exchange, identified this publication as their most successful method of promotion. Perhaps this is because that exchange is unique in providing descriptions of successful transactions, including in most cases the accruing financial benefits, in each issue of their bulletins (see Appendix I). When the representative of a company reads through these lists he is bound to recognize the potential of the services provided by exchange and so be encouraged to participate in its programs.

Reliance on passive means of promotion such as attendance at seminars and waste exchange conferences and the publication of articles in trade journals and news media undoubtedly reflects the budget and staff limitations of most exchanges. Clearly, although active methods such as presentation of educational programs, networking and personal contact with industry are more time consuming and expensive, they could play a much more important role in overall marketing strategies.

Many exchanges distribute brochures and if these are targeted to the appropriate audience they can be an effective marketing tool. One exchange, for example, distributes information packages including brochures at industrial trade shows and conventions.

This review of methods of promotion has revealed a lack of focus of marketing effort, brought about in large part by a shortage of resources to commit to more focussed and active marketing plans. Such plans should be structured around direct contact with generators and potential users

of waste materials and active promotion of the services of the waste exchanges.

While passive promotional materials such as journal or news articles may occasionally reach the appropriate audience, more often than not they are discarded, glanced at briefly or ignored.

6.2 Marketing Budget

The marketing budget of the waste exchanges is generally very small. The average amount for the seven exchanges providing this information is 8%. The remaining exchanges either could not identify the proportion of their budget that is committed to marketing or indicated that no funds are allocated to this activity.

In light of the importance of marketing to this type of business, these figures would appear to be very low.

6.3 Bulletins

The major activity of all of the exchanges contacted is the compilation and publication of a waste materials bulletin. This generally serves two purposes, namely: to provide information on wastes and services available and wanted, and to solicit new listings and inquiries. Most exchanges do not find it an effective marketing tool.

In addition to listings of materials and services, many waste exchange bulletins contain information on current waste management legislation and upcoming conferences and workshops.

In terms of frequency of publication, the following distribution has been identified:

Times Per Year	Number of Exchanges
2	1
3	1
4	2
6	8
12	1
52	1

As shown, most exchanges publish a bi-monthly bulletin. This frequency of distribution is probably the most feasible due to the costs and time involved in compiling, printing and distributing each bulletin.

The Austrian Exchange publishes its listings in the weekly newspapers of the Chamber of Commerce. These are available to all 253,000 members of the Chamber. The West German Abfallborse publishes a separate monthly bulletin. In France the regional exchanges publish bulletins between two to four times per year. In addition, many European exchanges publish listings in the German monthly trade journal 'Chemical Industry'.

In terms of number of copies distributed, there is a wide variation, which corresponds to the size of local and/or regional waste markets. The maximum number of copies distributed is 40,000 (Austria), while the minimum is 400 (Montana). The Canadian waste exchanges each distribute between 900 and 3500 copies of their bulletins.

The mailing lists for the bulletins have been derived from a number of sources, including:

- Dun and Bradstreet industry lists
- Trade indices

- Chambers of Commerce
- lists of waste generators
- direct requests
- government agencies
- regulatory violators
- brokers-consultants and service faciilities.

In general, there does not appear to be a problem in developing the mailing lists, though the degree of penetration into appropriate sectors of industry is unknown.

6.4 Computers

The use of a paper documentation and database system imposes certain limitations on the functioning and effectiveness of the waste exchanges. This type of system is cumbersome, time consuming to maintain, often out-of-date and difficult to access quickly.

As a result, many of the waste exchanges have realized the advantages of utilizing a computerized database system to store, sort, retrieve and exchange information.

Most of these exchanges have realized that one way to expedite the transfer of materials is through the use of a computer database of material listings that can be accessed in an on-line mode by anyone with a microcomputer and a modem. Such a database can be updated easily whenever a new listing is received, which makes it much more useful than a publication which is out-of-date soon after it is released. It can also be used to monitor the

effectiveness of the exchange through tabulated accounts of listings, inquiries and transactions.

Of the 14 exchanges responding to the survey, nine have already installed a computer system, while two others are presently developing such a system.

Most of the North American waste exchanges are now committed to the development of a unified database of waste products available or wanted. Many are already sharing listings. To this end many of these exchanges have standardized their computing systems around the software package 'Dbase', though several versions of this are currently being used. While not all exchanges currently allow outside access to their system, this will likely eventually occur if funding is available to purchase and maintain appropriate systems.

Confidentiality of information both on the computer database and in the published bulletin is usually maintained through a coding system. Confidential listings promote the participation of companies with problem wastes as well as those who are concerned about protecting information regarding their processes and operations from potential competitors. For this reason, prospective users must contact the exchange in order to have their names passed on to the generator. On the computer database, in addition to the coded references, users must first obtain a password to enable access to listings information.

6.5 Networking

The waste exchanges appear to be moving towards networking as a means of increasing their effectiveness. This is being accomplished through annual conferences, casual contact and the development of the National Waste Exchange Data Base. Greater emphasis is also being given to direct contact with waste generators and users.

In the Canadian context however, the approach to networking is generally somewhat fragmented and could benefit through more formal contacts, perhaps through the auspices of a national coordinating body.

6.6 Successes, Problems and Suggestions

6.6.1 Successes

A number of successes have been identified by some waste exchanges, namely:

- a steady increase in listings and inquiries
- increased distribution of the bulletin
- the acceptance of the waste exchange as a viable option to waste disposal.

Unfortunately, not all exchanges have experienced these types of success.

6.6.2 Problems

All of the waste exchanges contacted believed that there were virtually no problems in the area of marketing, apart from the lack of funds to devote to further efforts

in this area. Within their existing budgets, they believe that they are being as effective as possible.

With more substantial budgets marketing efforts could be redirected into potentially more effective areas which would in turn build upon those current efforts.

6.6.3 Suggestions

In light of the above problem further government funding to pay for marketing initiatives has been suggested by a number of waste exchanges.

7.0 LEGISLATION

7.0 LEGISLATION

7.1 Current Legislation

There is no current legislation in Canada and little in the United States that directly regulates or promotes the use of waste exchanges. Instead, existing legislation tends to be directed to the broader aspects of waste management including storage, transportation, treatment and disposal of waste materials. Such legislation does however indirectly affect the success of waste exchanges and therefore will be briefly reviewed in the following sections.

7.1.1 Canadian Legislation

Table 7-1 provides a list of Federal and provincial legislation pertaining to the transportation and management of hazardous or 'special' wastes in Canada.

a) Federal Legislation

Federal legislation with some relevancy to hazardous wastes is listed in Table 7-1. While this legislation does, in several specific instances, limit and control the release of harmful substances into the environment, it does not comprehensively address the management of hazardous wastes. Jurisdiction over the handling, transportation, storage, treatment, destruction and disposal of these wastes is controlled instead by the provincial and territorial governments.

The Federal Transportation of Dangerous Goods Act is the only exception to this rule. This Act and its

TABLE 7-1

CANADIAN LEGISLATION GOVERNING THE TRANSPORTATION AND MANAGEMENT OF HAZARDOUS WASTES

Jurisdiction	Legislation
A. Federal	Arctic Waters Pollution Prevention Act Atomic Energy Control Act Canada Shipping Act Environmental Contaminants Act Fisheries Act Ocean Dumping Control Act Transportation of Dangerous Goods Act
B. Provincial	
Alberta	Agricultural Chemicals Act Alberta Special Waste Management Corporation Act Clean Air Act Clean Water Act Department of Environment Act Hazardous Chemicals Act Hazardous Waste Regulation Hazardous Chemicals Amendment Act Oil and Gas Conservation Act Public Health Act Waste Management Regulation Transportation of Dangerous Goods Control Act
British Columbia	Health Act Pesticides Control Act Transportation of Dangerous Goods Act Waste Management Act Special Waste Regulation
Manitoba	Clean Environment Act Waste Disposal Grounds Regulations Dangerous Goods Handling and Transportation Act Manitoba Hazardous Waste Management Corporation Act Pesticides and Fertilizers Control Act Public Health Act
New Brunswick	Clean Environment Act Health Act Pesticide Control Act

TABLE 7-1

CANADIAN LEGISLATION GOVERNING THE TRANSPORTATION AND MANAGEMENT OF HAZARDOUS WASTES

Jurisdiction	Legislation
B. Provincial (cont'd)	
Newfoundland	Dangerous Goods Transportation Act The Department of Health Act The Department of the Environment Act Environmental Assessment Act Pesticides Control Act The Waste Material (Disposal) Act
Nova Scotia	Dangerous Goods Transportation Act Environment Protection Act
Ontario	Dangerous Goods Transportation Act Environmental Assessment Act Environmental Protection Act Waste Management Regulation (O. Reg. 309) PCBs Regulation (O. Reg. 11/82) Spills Regulation (O. Reg. 618/85) Municipal Act Ontario Waste Management Corporation Act Pesticides Act Planning Act
Prince Edward Island	Dangerous Goods (Transportation) Act Environmental Protection Act Pesticides Control Act
Quebec	Environmental Quality Act Hazardous Waste Regulation Regulation Respecting Solid Waste Regulation Respecting the Transport of Waste Highway Safety Code
Saskatchewan	Dangerous Goods Transportation Act Department of the Environment Act Environmental Management and Protection Act Mineral Resources Act Pest Control Products (Saskatchewan) Act Public Health Act Vehicles Act
Yukon Territory	Dangerous Goods Transportation Act

regulations set out safety requirements for the handling and transportation of hazardous goods, including recyclable materials and wastes. It describes a system of classification for the identification of dangerous goods and describes the documentation required for their transportation. Manifest forms must be completed by the consignor (shipper), carrier and consignee (receiver) which detail the quantity, composition, origin and destination of the material being transported. This Act controls interprovincial and international movements of dangerous goods by air, sea, rail and road. Shortly after this legislation was enacted in 1985 most provinces and territories passed acts controlling intraprovincial transportation of dangerous goods, adopting by reference some or all of the Federal regulations. A package of amendments to the Transportation of Dangerous Goods Act is currently being drafted which will permit the manifesting of recyclable wastes to be optional at the discretion of provincial jurisdictions.

b) Provincial Legislation

In this section, emphasis will be given to the legislation in provinces which currently support a waste exchange: Ontario, Manitoba, Alberta and British Columbia. In general, with the exception of provincial Transportation of Dangerous Goods Acts and Guidelines governing the location, operation and maintenance of disposal sites, the provinces of Saskatchewan, New Brunswick, Nova Scotia, Newfoundland and Prince Edward Island currently have no legislation that deals specifically with hazardous wastes.

In Ontario, General Regulation 309 under the Environment Protection Act prescribes standards for the location, maintenance and operation of disposal sites, treatment facilities and collection vehicles. It also includes provisions for an expanded manifest system that allows for cradle-to-grave tracking of wastes. In addition, the regulation defines various types of wastes, including hazardous wastes.

The regulation's definition of 'recyclable material' is of particular relevance to waste exchange programs. This material is defined as waste which will be wholly utilized in an agricultural, manufacturing, commercial or industrial process or which will be promptly packaged and/or offered for retail sale to meet a 'realistic market demand'. Excluded from this definition are materials that are destined for combustion or land application, as well as hazardous or liquid industrial wastes that are not being transported directly from the generation facility to the recovery site. All materials that are defined as recyclable are exempted from certain provisions of the Act and from the regulation itself.

British Columbia's new Special Waste Regulation governing the implementation of the Waste Management Act includes a definition of recyclable material similar to that contained within the Ontario legislation. Exemptions from the Act, siting standards and operational requirements for special waste and recycling facilities described by its regulations, however, are provided only for materials that are recycled on-site, or if they constitute less than 5% by weight of all materials being fed into a process located off-site. In addition, waste that is directly recycled on-site, that is without

pretreatment or storage, does not need to be included in the generator's registration report.

The effect of both these pieces of legislation is to reduce the amount of documentation required by shippers, carriers and receivers of certain wastes in Ontario and British Columbia and to thus facilitate the exchange of recyclable materials in those provinces.

British Columbia, Manitoba, Ontario and Quebec have enacted legislation requiring the registration of all parties involved in the generation and storage of hazardous wastes. Registration reports must include information describing the amount of each special waste being generated and stored, its physical state, the source or type of generating process and the methods by which it is handled. Generators, (as well as operators of recycle facilities as defined in the B.C. regulations) must also maintain on-going records of all transactions and operations involving the waste. This type of documentation can be used to develop a tracking system such as the one operated by Ontario's Ministry of Environment which contains profiles of every known waste generator, carrier and receiver in that province. Such documentation could also be used to facilitate compliance with existing laws and to identify potential participants in waste exchange programs.

British Columbia, Manitoba, Ontario and Quebec also require that all carriers and operators of treatment and disposal facilities have a special license, permit or certificate of approval. All parties involved in the transfer of wastes must also comply with the Federal and provincial Transportation of Dangerous Goods Acts. In

some provinces, exemptions are given when a quantity or volume of waste below a set minimum is involved.

In some cases, provincial waste managers may request prospective permittees to comply with additional standards that are not explicitly described within the legislation, but which could be useful in encouraging participation in waste exchange programs. In Manitoba, for example, the manager may set standards for waste recycling, reuse and disposal systems. Similarly, in British Columbia the manager can require the permittee "... to recycle certain wastes and to recover certain reusable resources, including energy potential from wastes".

Although Alberta's Hazardous Chemicals Amendment Act 1982 contains provisions setting out registration requirements for waste generators, carriers and disposal facilities, these sections are not yet in force. The Department of the Environment however, is currently in the process of registering all such parties.

In Ontario, a generator who does not have a certificate of approval for a waste disposal facility must file a report with the Ministry of Environment if a given waste has been stored for longer than three months. The composition and quantity of the waste, as well as the manner in which it is being stored must be described. In addition, the generator must provide reasons for the prolonged storage period and describe the anticipated time and manner of disposal of the waste.

Similar requirements are set out in Quebec's Hazardous Waste Regulation. In that province wastes must be recycled or disposed of within a period of 12 months.

In British Columbia, the Waste Management Amendment Act 1987 introduced the concept of a Waste Management Trust Fund. Such a fund may be established by the Minister from money collected or received under the Special Wastes Regulation in order to provide funds for long term care and maintenance of waste management facilities. Such money could also be used to undertake an "... environmental clean up necessitated by inadequate closure of waste management facilities". In Ontario, the Environment Protection Act established a similar Waste Disposal Security Fund in order to pay for environmental compensation claims. The money for this fund is generated through fees paid for the operation of waste management systems and disposal sites.

7.1.2 American Legislation

Two major pieces of legislation are used to regulate the management of hazardous wastes in the United States. The first, the Resource Conservation and Recovery Act (RCRA) currently governs the management of wastes from the perspective of the protection of human health and the environment. It also sets minimum acceptable standards for state regulations regarding hazardous wastes. It provides for the identification of hazardous wastes and describes standards applicable to generators and transporters as well as owners and operators of hazardous waste treatment, storage and disposal facilities. It also provides for issuance of permits and identification

numbers for all parties engaged in the treatment, storage and disposal of such wastes.

The second major piece of legislation governing hazardous waste management is the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA). This Act was used to set up Superfund and to establish financial responsibility for damages arising from incidents involving the release of hazardous materials into the environment. Superfund provides funds collected through special taxes which are used to pay for the remedial action that is usually necessary in the event of such incidents.

Elements of both of these pieces of legislation influence the success of industrial initiatives to recycle wastes in the U.S. and therefore the effective operation of American waste exchanges.

Recent reviews of this legislation as it pertains to the operation of waste exchanges have been prepared by Banning and Jones (1985), Garelick and Kerr (1986) and Dawson and Mercer (1986).

Major components of these two acts that affect recovery and reuse of hazardous wastes include:

1) <u>Definition of Solid Wastes</u>

- Hazardous wastes are subsets of solid wastes and are described by the EPA list of waste streams.
- Wastes that are recycled directly (i.e., without storage or treatment) are generally not defined as solid wastes and therefore escape regulation by RCRA.

- Similarly, once a waste has been regenerated into a usable product it is no longer considered to be a solid waste and is therefore not regulated by RCRA.

- If a company engages in 'speculative accumulation' of a product such that less than 75% of the material is recycled or transferred within one year, that product may be regulated as a solid waste.

- Since 1984, when certain provisions of RCRA were amended to include small generators producing less than 1000 kg of waste per month, many additional firms (including dry cleaners, auto repair shops, printers and retail stores) have had to develop waste minimization programs.

2) Cradle-to-Grave Management

- According to CERCLA, liability for the costs of remedial action following the release or threatened release of hazardous wastes may be:

  - strict (without regard to fault)
  - retroactive
  - joint and several
  - assigned regardless of proof of cause
  - derivative, placing liability on shareholders, officers, directors and successors-in-interest.

- As in some Canadian provinces, waste generators must register, maintain records of wastes produced and comply with manifest requirements. Carriers and receivers must be permitted and must also take part in the documentation and transportation manifest system. In addition, generators must prepare biennial reports describing waste reduction activities. The existence of all of this documentation facilitates compliance with regulations governing hazardous waste management.

3) Permit Requirements

- All parties engaged in the treatment, storage or disposal of hazardous wastes must obtain a permit which defines the extent and nature of those activities. Similarly, recyclers must also apply for a permit and identification number. These permits are generally very difficult to get and in many cases effectively discourage the potential recovery of waste products that are generated infrequently or sporadically.

4) The Environmental Protection Agency
Uniform Hazardous Waste Manifest System

- A generator must complete a manifest when shipping a waste off-site. In addition, the generator must certify that all practical measures have been taken to develop a program that reduces the volume and/or quantity and toxicity of his waste. Participation in a waste exchange may be used to satisfy the waste minimization and certification requirements of RCRA.

- Generators do not have to use the manifest if their waste is being reclaimed under a contractual arrangement where either the recycler or generator retains ownership of the material throughout its generation, transportation and reclamation.

- Criminal penalties may be assessed to transporters who deliver waste products to non-permitted treatment, storage or disposal facilities.

- EPA coordinates all transportation-related regulations with the Department of Transport which is responsible for the Hazardous Materials Transportation Act.

7.2 Effect of Current Legislation on Waste Exchange Programs

Most American waste exchange operators felt that current legislation governing hazardous waste management limits, and in some cases, hampers the effectiveness of their programs. Cradle-to-grave liability provisions were frequently described as a significant deterrent to industrial recycling. Regulations that focus on controlling storage, treatment and disposal of hazardous wastes seldom place any emphasis on the minimization of these wastes. Furthermore, the complex definition of solid wastes contained within RCRA, particularly with regard to the storage of these materials prior to recycling, has had a negative impact on at least one of these exchanges. Many small companies cannot accumulate enough of a given

waste product within the stipulated one year period to make recycling economically practical.

Similarly, complex liability concerns may confuse potential generators and recyclers and so discourage or prevent exchanges.

In California, provisions of the state Health and Safety Code address the promotion of recycling and recovery of hazardous wastes and the establishment of clearinghouses to assist in this recovery. An impediment to recycling in that state however, arises through the use of the Department of Health Services, California Hazardous Waste Facility permit system. This permit system, in which all commercial recyclers must participate, was invoked to discourage fraudulent recycling practices that were being used to avoid waste management regulations. The permits are similar to those required by RCRA, and are generally very difficult to get.

In Maryland, no generator can dispose of a waste in a landfill unless it has been rejected by a recycler or a treatment facility. Under the supervision of the Health Department, which can make judgments regarding the suitability of a company's participation in an exchange program, all generators must list their wastes with an exchange. Exemptions are given for reasons of economic hardship, in cases involving disclosure of a trade secret or for situations in which no potential exists for recycling.

In 1986, Illinois attempted to promote the use of the Industrial Material Exchange Service by proposing the implementation of a similar law known as the Illinois

'Land Ban'. Currently in Illinois, as in Maryland, a waste that has been designated as recyclable, must by law, be recycled. The only exceptions to this rule are cases in which the generator can prove that the recycler will not manage the waste in accordance with the regulations and standard industry practices. The 'Land Ban' rules would have exempted any generator who could demonstrate that he had unsuccessfully listed his waste either with an exchange service or a widely circulated trade journal. While in effect during the first half of that year, the proposed rules significantly reduced the effectiveness of the exchange. Many generators listed wastes which had little or no chance of being recycled; many listings were made involuntarily, so that inadequate information concerning the waste material was available; and, in order to avoid complicating the definition of 'demonstrate', the Industrial Materials Exchange Service no longer provided advance information on markets to listers.

Most Canadian waste exchange operators agreed that current Federal and provincial legislation is at least somewhat effective, albeit indirectly, in promoting the use of waste exchanges. Legislation promoting environmental protection and the reduction of hazardous wastes tends to increase the costs of treatment, transportation and disposal. These high costs, in turn, promote the recycling of industrial wastes and makes the use of landfills, rather than waste exchange programs, the option of last resort.

In Ontario, the exemption of materials that are being directly recycled from the Environmental Protection Act and General Regulation 309 has provided an incentive for

waste generators to attempt to recover and recycle their wastes. In some cases, this exemption may be used to prolong the storage time of materials beyond the limitations set by the regulation for hazardous wastes. This practice may be beneficial to small generators who must accumulate enough wastes to make their transportation and transfer economically worthwhile.

Most complaints regarding current Canadian legislation were focussed on Ontario's Regulation 309. One operator felt that the law was too slow to respond to requests for the removal of 'recyclable material' from hazardous waste designations and to grant approval to industry to proceed with recycling initiatives. The requirement for certification of analysis in all cases involving pretreatment of recoverable goods was also considered to be too inflexible and cumbersome. Further, the requirement which would force potential receivers of recycled goods to become licensed was also viewed as a disincentive to the use of waste exchanges and the successful transfer of waste products. According to one Canadian waste exchange operator, the permitting process is very difficult, particularly if a hearing is required and can be a significant deterrant to the transfer of wastes.

According to a few American waste exchange operators, legislation has been proposed or recently enacted in several states which will directly affect the success of their programs. For example, Michigan has proposed waste reduction legislation that would provide tax credits for successful exchanges of waste. The state of New York has recently made funds available for waste minimization programs for which the Northeast Industrial Waste Exchange may be eligible.

In Canada, the new Federal Environmental Protection Act, is expected to affect the success of waste exchange programs through provisions which further limit and control the release of hazardous substances into the environment. The same is true of all pending provincial legislation governing the treatment and disposal of hazardous wastes. In addition, British Columbia's new Special Waste Regulation may encourage generators to recycle in order to avoid the need for compliance with registration requirements.

Fifty-four percent of the waste exchange operators surveyed in this study felt that industry should be legally required, under certain conditions, to list their hazardous wastes with an exchange prior to proceeding with disposal; 36% were opposed to the enactment of this type of law.

The conditions attached to the passage of such a law included the assurance of anonymity for the company involved and the provision of additional funding for the operation of the waste exchange. One Canadian operator felt that it may be beneficial to require waste generators to demonstrate their commitment to waste minimization by forcing them to take part in waste programs. As previously described, a law that could encourage this type of participation by American generators has been enacted in the U.S. such that all companies who ship wastes off-site may include their participation in a waste exchange as proof that they have undertaken a program of waste reduction. Given the experience of the Industrial Materials Exchange Service following the introduction of the 'Land Ban' in Illinois,

as described earlier, it is possible that this type of legislation could backfire.

Waste exchange operators that were opposed to making participation by industry compulsory felt that such a law would increase their workload without influencing their effectiveness. If, for example, only 10% of all waste materials are recyclable, a document which attempted to list all wastes would be unmanageable. In addition, the majority of these listings would be of no interest to potential recyclers.

7.3 Legal Responsibility for the Safe Handling, Transport and Storage of Wastes Listed in Waste Exchanges

Both the Alberta and the Manitoba Waste Exchanges include a disclaimer in their listing bulletins which is intended to absolve them of responsibility for the "... determination of the character or content of any item listed, or for the determination of what may constitute a hazardous substance or what may create a hazardous condition". In addition, neither exchange makes recommendations concerning legal requirements for storage, handling, transportation or disposal of hazardous substances.

In Canada legal responsibility for a waste product can be transferred between parties and is generally determined through negotiations and contractual arrangements made between the generator, shipper and receiver. All transfers must comply with provincial and Federal regulations governing the transportation and handling of dangerous goods.

As previously described, in Ontario, the potential delisting of a waste that has been determined to be directly recyclable does pose an incentive to the participation of waste generators in exchange programs. When a waste is reclassified as recyclable it is no longer necessary for the generator to maintain records, complete the transportation manifest or ensure that the waste is being sent to a licensed receiver so long as it is remaining within that province. This exemption does not apply, however, to interprovincial or international shipments which are governed instead by the Federal Transportation of Dangerous Goods Act. The exemption is particularly useful to parties who only occasionally ship or receive small quantities of wastes because it absolves them of the need to keep close track of these materials. This type of documentation is much easier to maintain when regularly shipping and receiving large quantities of materials.

In the United States, liability for a waste may be shared among all parties, however, it is the waste generator who is ultimately responsible for its safe handling, transportation, storage and disposal. The only exception to this rule may occur in situations where the waste is used directly as a feedstock for the manufacture of a secondary product.

While most waste exchange operators felt that the existing transportation system and current Transportation of Dangerous Goods legislation, particularly within Canada, were adequate to facilitate the exchange of hazardous wastes, a few were critical of the American system and laws dealing with transboundary movements of goods. In the United States, shipping requirements are

frequently inconsistent between states. Complex interstate and international regulations, as well as high insurance rates were cited as examples of disincentives to transboundary movements.

7.4 Summary

- With the exception of waste management regulations in Ontario and British Columbia which have the effect of facilitating the direct transfer of waste materials, most Canadian legislation has little effect on the success of industrial recycling programs. In contrast, several American laws discourage the participation of industry in such programs, including those of waste exchanges.

- Major legislative deterrents to the use of waste exchanges in the U.S. include provisions for cradle-to-grave liability, rigorous permit requirements for recyclers, carriers, and treatment facilities, constraints on storage times, and the complex, mercurial definition of solid waste.

- In the U.S., participation in a waste exchange may be used to satisfy the waste minimization requirements of RCRA that must be fulfilled prior to transporting waste material off-site.

- Several Canadian provinces have recently enacted regulations that include registration requirements for generators of hazardous or 'special' wastes and permit requirements for carriers and all storage, treatment and disposal facilities. In concert with provincial and Federal manifest systems, these regulations could facilitate cradle-to-grave tracking of waste materials.

- In some cases, provincial waste managers may request prospective permittees to comply with additional standards that are not explicitly described within existing regulations, but which could be useful in encouraging participation in waste exchange programs.

- In British Columbia and Ontario, waste management regulations include provisions for waste management trust funds that may be set up to satisfy the need for long term care of treatment and disposal

facilities or to pay for environmental compensation claims. The money for these funds may be collected through registration and/or permit fees.

- Fifty-four percent of all surveyed waste exchange operators would support a legal requirement for participation in their programs. Attempts to legislate such compulsory participation have been made in Maryland and Illinois. While in effect in the latter state, this law resulted in the listing of many unrecyclable wastes, significantly reducing the effectiveness of the local exchange.

PART III - REVIEW OF INDUSTRY AND GOVERNMENT PERSPECTIVE

8.0 PERSPECTIVES OF PROVINCIAL GOVERNMENTS

9.0 PERSPECTIVES OF INDUSTRY ASSOCIATIONS

10.0 PERSPECTIVES OF THE PUBLIC SECTOR

8.0 PERSPECTIVES OF PROVINCIAL GOVERNMENTS

PART III - REVIEW OF INDUSTRY AND GOVERNMENT PERSPECTIVE

8.0 PERSPECTIVES OF PROVINCIAL GOVERNMENTS

Provincial and territorial members of a working committee of the Canadian Council of Resource and Environment Ministers from Nova Scotia, Ontario, Yukon, the Northwest Territories, Manitoba, Saskatchewan and Alberta were contacted during this study. They were asked for their views on:

- initiatives of government with respect to waste exchange programs
- existence of legislative incentives to promote the use of waste exchanges
- existence of economic, political or legislative barriers to the use of waste exchanges
- methods of improving effectiveness of waste exchange programs
- additional suggestions.

The following is a summary of their responses.

8.1 Government Initiatives

Ontario, Manitoba and Alberta currently provide financial support and technical assistance for their provincial waste exchange programs. In Ontario, the Ministry of Environment became involved in the financial support of the Ontario Waste Exchange in April 1987 and currently provides 50% of the funding for that operation. As a result of this funding it has been possible to hire a full-time staff person who can actively pursue waste exchange opportunities and promote other waste minimiza-

tion concepts, as well as provide technical expertise through direct contacts with industry. The remainder of the funding is supplied by the Ontario Waste Management Corporation. The operation of the exchange partially fulfills the Corporation's long term commitment to encouraging reduction, reuse, recovery, recycling and exchange of wastes.

In Manitoba, the Manitoba Waste Management Corporation oversees the operation of the provincial exchange but has a contractual agreement with Biomass Energy Institute which actually runs the exchange. This arrangement was made in order to satisfy the perceived concerns of industry regarding potential conflicts of interest with regulatory agencies. As a result, the Corporation has no access to the identity of companies that list waste materials in the exchange bulletin. In addition to financial support, technical assistance is provided by staff from the Waste Management Corporation concerning disposal problems and other matters that arise through contacts between industry and the waste exchange operator. Furthermore, government staff often suggest that a company register with the waste exchange in situations where waste management problems have arisen and they have been called in to give advice.

The Alberta Waste Exchange is a cooperative project of the Alberta Research Council and Alberta Environment. It is operated by the Research Council and receives all of its funding from the provincial government. The concept for the exchange originated within Alberta Environment and consequently throughout its first year of operation, members of this department were very involved in providing administrative, planning and technical advice

to exchange operators. Over the last few years the department has been active in promoting the use of the exchange and its members continue to encourage participation in it through all of their personal contacts with representatives from industry.

Government representatives from provinces and territories that do not currently have a waste exchange were generally not well informed concerning the potential of such a program. Exceptions to this were the representatives from the Saskatchewan Department of Environment, who, as a result of the recent study completed by the Saskatchewan Research Council, were enthusiastic about the need for a provincial Industrial Assistance Program that would include a waste exchange. Unfortunately, due to lack of funding, it has not been possible for them to initiate such a program. At the present time wastes are exchanged in Saskatchewan through personal contacts made between Department of Environment staff and representatives from industry. Contact generally occurs following an incident involving a specific waste management problem and if the exchange of waste materials seems to be an appropriate solution, the company is referred to the Canadian Waste Materials Exchange in Ontario.

8.2 Legislative Incentives to Promote the Use of Waste Exchanges

At the present time, the political climate in most provinces favors industrial involvement in waste minimization, recovery and recycling programs. Most government representatives contacted during this survey, however, felt that more stringent, appropriately applied regulations involving waste management, combined with

increasingly high disposal costs and the shortage of secure landfill sites, would make industrial participation in waste exchange programs more attractive.

8.3 Economic, Political and/or Legislative Barriers to Use of Waste Exchanges

The primary economic barrier to the use of waste exchanges identified in the survey of government representatives was the high cost of transportation of waste materials over long distances.

As discussed in Section 7.0 - Legislation, the complex definition of solid wastes and the application of strict generator liability have proven to be a significant disincentive to American industries interested in participating in waste exchange programs. In Canada, the ownership and liability of waste materials can be transferred. According to the representative from the Ontario Ministry of Environment however, some companies still express concern over their liability and as a result may be reluctant to begin recycling a hazardous by-product. In addition, he suggested that certification of carriers and receivers of waste materials may also provide a disincentive to the use of waste exchanges.

In two instances, concern was expressed regarding the source of funding for waste exchange programs. It was felt that government should accept responsibility for these operations given the lack of interest demonstrated by industry in funding any program that does not provide it with a direct benefit and major service. It was felt that waste exchanges could not be expected to operate on a self-sufficient basis.

8.4 Methods of Improving Effectiveness of Waste Exchange Programs

Most of the representatives from government who were contacted in this survey felt that an increase in promotional and marketing activity would improve the effectiveness of existing exchanges. Many companies across Canada are still unaware of the existence of the provincial waste exchange programs. Operators of exchanges in at least two provinces are encouraged to make presentations at local conferences on waste management, to attend meetings of industrial and municipal committees and to contribute articles to trade journals and newsletters.

In Ontario, regional and local levels of government either have or are beginning to implement local (county, regional, municipal) exchange programs which will receive provincial assistance through the Ontario Waste Exchange. These local programs will serve as conduits of information to the Ontario Waste Exchange regarding potential sources and/or users of recyclable materials.

8.5 Additional Suggestions

Two survey participants discussed the benefits of active exchanges capable of promoting the exchange of materials for which there is no current market. Active exchanges were identified as being more useful, in the long term, than passive exchanges. One respondent suggested that a network of special materials exchanges be developed and that more emphasis be given to the participation of light industry and the commercial/retail sector.

One government representative expressed concern that the success of waste exchanges should not be judged solely in terms of their ability to effect a reduction in hazardous wastes. He felt that the intent of an exchange should be to promote the reduction of all wastes requiring disposal.

Most respondents agreed that provincial exchanges would be more effective than larger regional operations due to their ability to make close contact with local industries and to actively pursue recycling opportunities. The representative from the Nova Scotia Department of Environment, on the other hand, felt that there should be a regional exchange capable of serving all of the Maritime provinces.

Survey respondents also felt that while the existence of a national exchange was important, it should play more of a coordinating or management role and that it should be linked to the smaller, provincial exchanges by a network of compatible computer programs and databases.

8.6 Summary

- In Canada, the operators of each of the provincial exchanges maintain a close liaison with government staff from whom technical support is received.

- Although there is no Federal or provincial legislation that specifically promotes the use of waste exchanges, the present political climate in Canada favors involvement by industry in waste minimization and recycling programs. Increasingly realistic disposal costs, combined with more stringent environmental regulations will further encourage industrial participation in these programs.

- Some government representatives expressed concern regarding on-going sources of funding for waste

exchange programs. They felt that waste exchanges could not be expected to operate on a self-sufficent basis.

- With the possible exception of a large regional exchange serving all of the Maritime Provinces, most government representatives felt that provincial exchanges would be most effective in meeting the needs of industry. These provincial exchanges could be supported by efforts of government staff at the county or municipal level who would refer potential participants to them. In addition, a national exchange could function to coordinate the activities of each of the provincial exchanges.

9.0 PERSPECTIVES OF INDUSTRY ASSOCIATIONS

9.0 PERSPECTIVES OF INDUSTRY ASSOCIATIONS

Representatives of nine Canadian industry associations were contacted during the course of the waste exchange survey. These assocations included:

- B.C. Fabricare Association
- Canadian Chemical Producers Association
- Canadian Fertilizer Institute
- Canadian Manufacturers Association
- Canadian Paint and Coatings Association
- Canadian Petroleum Association
- Canadian Pulp and Paper Association
- Footwear and Leather Institute of Canada
- Tanners' Association of Canada

They were asked for information concerning:

- the familiarity of their members with the waste exchange concept
- current and potential use of waste materials generated by other industries
- current waste management practices and recycling initiatives
- impediments to the recovery and recycling of wastes
- the relevance of waste exchanges to their industry
- suggestions for improving the effectiveness of waste exchanges.

In the case of the Canadian Petroleum Association, representatives from both the petroleum processing and the refining sectors of the industry were interviewed.

Survey information was received from all industry associations that were contacted during the course of the study, with the exception of the Canadian Manufacturers Association. Although several representatives of this association were contacted in Vancouver, none was prepared to address the issue of waste exchanges.

9.1 Current Waste Management Practices and Recycling Initiatives Undertaken by Industry

Table 9-1 lists the waste products that are generated by the industries that were included in this survey. Although it is forbidden by some of the provinces to landfill some of the wastes listed, the table identifies the most common treatment and/or disposal methods still in use.

According to the study done by Reid, Crowther and Partners Ltd. (1980), half of all hazardous wastes produced in northwestern Canada are generated by the petroleum processing industry. At the present time this industry is actively involved in pursuing and maintaining chemical markets for many of these wastes. Waste caustic, for example, is sold to the pulp and paper industry for use in the pulping process. Elemental sulfur, extracted during the processing of natural gas, is used in the manufacture of fertilizers. Spent catalysts are sold to the metallurgical industry and waste oils are collected and sent to commercial recyclers.

Recycling initiatives are also being actively pursued by the pulp and paper, paint and coatings, dry cleaning and

TABLE 9-1

WASTES GENERATED BY SELECTED CANADIAN INDUSTRIES

Industry	Waste	Disposal/Treatment
Chemical Producers	Very diverse. Includes - organic & inorganic chemicals - pesticides - adhesives, sealants, inks - plastic & synthetic resins	incinerated/burnt for fuel/ injection wells/landfill/recovered
Fertilizer Producers	- gypsum - salt	settling ponds salt piles
Paint & Coatings	- aquaeous & solvent based sludges - solvents - spoiled product batches - empty pigment bags	recycled/treated before landfill recycled/landfill recycled landfill
Petroleum Processors & Refiners	- acid water, alkaline solutions - catalysts, desiccants - caustic - sludges & residues - waste oils - filters - lubricants and greases - treater hay	injection wells recycled/landfill recycled land farming/landfill/incineration recycled/burnt for fuel/dust suppressant landfill/incinerated landfill/incinerated landfill
Pulp and Paper	- solvents - waste oils	recycled/landfill burnt for fuel/recycled
Footwear & Leather	- leather, fleece, shoe linings	landfill/incinerated
Tanners	- organic waste - chromium - waste water sludge - dyes	treated before landfill neutralized landfill recycled
Dry Cleaners	- still bottoms-sludges - solvent - cartridges	landfill recycled landfill

leather tanning industries as well as by certain chemical producers.

Members of the pulp and paper industry, for example, recycle waste solvents through direct contact with other companies, or in some cases, via a waste exchange.

The paint and coatings industry is currently introducing technological innovations which permit producers to recover and recycle sludges, solvents and spoiled or off-spec product batches. In addition, many paint manufacturers currently add dispersants to sludges created in the mixing of paints, discard the supernatant and sell the sludge as a filler coat for cement blocks (Campbell & Glenn, 1982).

The majority of dry cleaners who belong to the B.C. Fabricare Association currently recover all of the solvent perchlorethylene from their still bottoms and cartridges, prior to the disposal of these materials. Given the high cost of this solvent, this recovery makes economic sense for most small dry cleaning operations.

The tanning industry also undertakes in-house recovery of dyes and the wash from tanning drums.

Many large American chemical companies (i.e., Monsanto Chemical Industries and Union Carbide) are currently engaged in recycling programs in which wastes are reused in-house as well as sold off-site (Campbell and Glenn, 1982).

Representatives of the Footwear and Leather Institute and the Canadian Fertilizer Institute were unaware of any new

recycling initiatives being undertaken by their members. In contrast to the perceptions of the other four associations that responded to the survey, the representative of each of these associations felt that there were no significant waste management problems within their industry at the present time. This response, particularly with respect to the Canadian Fertilizer Institute, was surprising given that industry's present situation concerning long term maintenance of phospho-gypsum waste lagoons.

9.2 Current and Potential Uses of Waste Materials

As described above, markets currently exist for many of the waste materials generated by the industries included in this survey. Of particular importance in this regard are certain types of solvents, alkalies, concentrated acids, catalysts, oils and combustibles as well as wastes having high concentrations of recoverable metals or low concentrations of valuable metals. Transfers of such materials can be expected to occur most frequently from large companies using continuous processes to smaller companies using batch processes, from basic chemical manufacturers to formulators, and from industries with high purity requirements to those with lower purity requirements (Terry Jr., et. al., 1976).

Representatives of most associations expressed doubt or skepticism regarding the potential for using waste products recycled from other industries. Most were either unaware of useful wastes or dismissed the potential for using such wastes. In some cases this attitude may be justified. For example, as a result of

safety considerations the dry cleaning industry depends on the use of the non-flammable solvent perchlorethylene. This solvent is produced as a by-product of the petroleum industry, specifically for the dry cleaning market. Perchlorethylene is not produced as a waste product by any other industry and cannot be safely replaced by an alternative solvent.

The paint and coatings industry on the other hand, can reuse certain slightly contaminated solvents in paint formulations and for cleaning mixing equipment between paint colour batches (Laughlin, 1985). This potential for reuse of solvents was identified by the representative of the paint and coatings industry.

Members of the tanning industry already depend almost exclusively on the meat packing industry as a source of animal hides.

In contrast, the representative of the Chemical Producers Association was unaware of any waste products generated by other types of industry which could be of benefit to his members. Given the success of some chemical companies, including Allied Chemical of Canada and Dow Chemical Canada in recycling waste materials, this statement appears to conflict with existing corporate practices.

Similarly, the representative of the Canadian Fertilizer Institute seemed unaware of several potential markets for waste gypsum. Depending on its level of purity, this material could be used instead of caustic or lime to neutralize acidic effluents generated by metal finishing

plants, bulk handling metal ore terminals and base metal mines.

9.3 Familiarity of Industry Associations With the Concept of Waste Exchanges

Representatives from the Canadian Chemical Producers Association, the Canadian Paint and Coatings Association, the Canadian Petroleum Association and the Canadian Pulp and Paper Association were all aware of the Canadian Waste Materials Exchange and, to a lesser extent, the three provincial exchanges. The Chemical Producers Association was also aware of the pilot waste exchange project that is currently operating in British Columbia. Although representatives from these four associations were unable to supply details of specific transactions, they each felt that their members were involved in local waste exchange programs, and that in the case of the Chemical Producers, one or two successful exchanges had taken place.

Representatives of the Canadian Fertilizer Institute, the Footwear and Leather Institute, the B.C. Fabricare Association and the Tanners' Association had no knowledge of waste exchanges. The latter two associations however, did express an interest in receiving information describing Canadian exchange programs.

The industry associations that were contacted do not provide any funding to Canadian waste exchanges, despite in some cases, direct requests that they do so. For example, in 1984, an unsuccessful attempt was made by the Canadian Waste Materials Exchange to solicit funds from the Canadian Pulp and Paper Association.

9.4 Impediments to the Recovery and Recycling of Wastes

9.4.1 Economic Impediments

Recycling is considered by industry to be economically practical where the value of the recycled commodity equals or exceeds potential disposal and raw material costs.

The high costs of chemical and solvent recovery systems were cited as impediments to recycling by the chemical producers, dry cleaning and, paint and coatings industries. It is difficult, particularly for small companies, to afford the capital and operating costs associated with the use of specialized recovery equipment. In many cases it is cheaper to use the raw feedstock. In some locations this problem may be overcome through the use of a company that provides centralized chemical or solvent recovery services.

Transportation costs were also frequently cited as a disincentive to recycling. For example, although successful in many areas, the cost of collecting small amounts of waste oil from a large number of dispersed sites, can make the overall cost of such a small scale recycling program exceed the value of the end product. The need to transport relatively dilute waste products over large distances was also described as a potential economic impediment to recycling.

9.4.2 Technological

Two factors appear to present technological impediments to recycling for most of the industries included in

this survey. The first factor is quality control and the need to match chemical and physical properties of available waste products with the specifications of raw materials they might replace. In many cases it is difficult to assess the exact composition of a waste product and this may in turn, severely limit its usefulness to certain industries. For example, waste oil may contain contaminants such as PCBs or lead that make it unsuitable for use as fuel or as a dust suppressant. The cost of analysis to determine product quality may also be very high. The physical state of a waste product is also important. If, for instance, a desired product such as chromium is contained within an emulsion, the difficulty and expense of recovery may preclude its reuse. On-going exchanges of waste materials of known quality between a specific generator and user that have been matched by a waste exchange could, in many cases, reduce these problems.

The second factor involves the lack of incentives to develop new technologies for waste recovery and reuse in a country such as Canada where the volumes of wastes produced are perceived to be relatively small, at least by certain industrial sectors such as the petroleum processors.

9.4.3 Regulatory

The length of time required to acquire permits or certification for carriers and recyclers of waste products was identified as a problem by one representative of the petroleum industry. In addition, it was felt that the complexity of international transboundary

regulations also posed a significant disincentive to the movement of waste products between Canada and the U.S.

The representative of the Chemical Producers Association felt that waste products that were capable of being recycled should be regulated differently than non-reusable waste materials. As previously discussed, this is the case for hazardous wastes and other materials that are recycled directly in the Province of Ontario.

Most waste exchanges offer confidentiality by way of coded listings in their bulletins, in order to protect the identify of participating companies. None of the industry representatives however, expressed any concern regarding need for confidentiality. Furthermore, none of the representatives expressed concern regarding likelihood of liability suits resulting from mishandling by the waste shipper or receiver. The threat of a liability suit is an important disincentive to the use of waste exchanges in the United States.

9.4.4 Information

Many of the respondents felt that lack of information concerning the availability of waste products, and in the case of the Chemical Producers Association, the potential market for waste products, was the most serious impediment to participation in recycling programs and waste exchanges. At least one representative, however, thought that this situation would improve in the future due to increasing awareness of industrial waste management problems.

The access to information, for example, to annual documents such as that published by the Canadian Association of Recyclers, was considered to be too costly, particularly for small companies. It was suggested that the recyclers themselves, perhaps with the aid of a government subsidy, should be responsible for these costs.

The representative from the petroleum refining industry also cited the lack of public interest in programs such as the recycling of waste oil by individual garages as an impediment to the success of programs such as waste exchanges.

Significant omissions in response to this question included the need for a guarantee of on-going product supply and the necessity for mutual confidence between the two parties involved in a recycling effort.

9.5 The Relevance of Waste Exchanges to the Industries

According to a representative of the petroleum industry, the use of waste exchanges may be more appropriate for primary or secondary manufacturers than it is for resource-type industries. Although the members of this association are familiar with waste exchanges and may use them in the future, a market already exists for most of the products that are currently appropriate for reuse. The petroleum sector is an example of a mature industry in which direct contacts with other industries have eliminated the need for participation in the waste exchange process.

In contrast, representatives from the Paint and Coatings Industry and the Chemical Producers Association were extremely interested in the waste exchange concept and felt that, if certain conditions were met, such as the introduction of more pro-active operations that would actively consult with generators regarding the potential of their waste products, waste exchange programs could be of benefit to their industry. A certain amount of this enthusiasm is due to the increasing lack of disposal sites for the wastes generated by these industries.

The representative of the Pulp and Paper Association had no personal knowledge of waste exchanges and felt that there was no real need for members of this industry to be involved in these types of programs.

As previously described, the representatives from the Footwear and Leather Institute and the Canadian Fertilizer Institute, the B.C. Fabricare Association and the Tanners' Association did not consider involvement of their respective industries in waste exchanges to be necessary at the present time.

9.6 Suggestions for Improving the Effectiveness of Waste Exchanges

Most of the industry associations included in the survey publish regular bulletins or journals which they distribute to their member companies. Some of the representatives felt that it might be useful to include an article or advertisement describing the Canadian waste exchange program in these publications once or twice a year.

According to the representative of the Chemical Producers Association, less than 10% of their members currently use Canadian waste exchanges. He suggested that these exchanges should take a much more aggressive approach to industrial recycling. Technicians associated with waste exchanges should meet with representatives from individual companies, undertake waste audits, catalog the components of their waste streams and actively pursue markets for the reusable products that have been identified in this process. The technician could also aid in identifying techniques for separating sources and managing residual wastes.

9.7 Summary

- Many Canadian industries have a lot to learn about the potential for recycling of waste products and the use of waste exchanges. With few exceptions, industry representatives displayed a lack of awareness and, in some cases, lack of interest in these programs.

- In mature industries, such as the pulp and paper and the petroleum industry, many companies are already actively engaged in the recovery and reuse of marketable wastes. Many of these by-products are used in-house. The remainder are sold to other industries in on-going contractual arrangements that have, in some cases, been in place for many years. Consequently, the representatives from these industries do not see the advantage of participating in waste exchange programs at this time.

- Overall, most Canadian industries are not interested in funding waste exchanges. They feel that it is government that must accept the financial responsibility for promoting the recycling of waste products.

10.0 PERSPECTIVES OF THE PUBLIC SECTOR

10.0 PERSPECTIVES OF THE PUBLIC SECTOR

The long term effectiveness of waste exchanges in promoting the re-use of industrial wastes will likely depend, to a large extent, on their incorporation in comprehensive waste management strategies. To date, most governments have been reluctant to undertake such comprehensive strategies, possibly because of the costs involved, the higher priorities of other programs, the long time frame for benefits and the limited time frame of their own mandate. In the future, governments that attempt to develop waste management programs will require support from the electorate and so it is important to examine the views of the general public with respect to the recycling, of waste materials. The following sections provide a brief discussion of public perspectives, based on the findings of several recent Canadian studies.

10.1 The Public Perspective

In the face of increasing shortages of land, more demanding environmental regulations and the high costs of conventional methods of collection and disposal, many municipal and regional governments across North America are beginning to seek alternatives to the use of landfills and incinerators. As a result of the educational programs associated with the promotion of recycling and waste recovery, public attitudes are changing. In provinces such as Alberta, British Columbia and Ontario, for example, large quantities of paper and/or glass are currently being recycled. In a few communities in Ontario and British Columbia the public is enthusiastically supporting curbside recycling programs.

Despite increasing public awareness of recycling alternatives and the social and environmental problems involved in traditional disposal methods however, many attitudinal barriers still exist which limit the effectiveness of recycling programs. Many members of the public in fact, share the same misapprehensions about recycling and waste recovery as the private, industrial sector. Based on the results of a study conducted by the Secondary Resources Development Council (Taylor, 1983), typical attitudinal barriers include:

- lack of awareness - particularly with regard to certain issues such as costs of packaging and the impacts of waste generation
- indifference - a natural byproduct of traditional methods of waste disposal
- inconvenience - separation and storage of materials for recycling take too much time, space and effort
- insufficient personal impact - individuals feel their contribution to recyclig would be insignificant
- dissatisfaction with collection systems - the reliability of recycling programs should be equal to that of traditional waste collection systems
- lack of incentive - recycling does not provide an obvious benefit to individuals (i.e., financial savings).

A further obstacle to recycling, shared by the public and industry, is the perception that recycled goods and materials are of inferior quality.

10.2 Social and Environmental Benefits

Providing the technology exists and is readily available, the recovery and reuse of waste materials can result in substantial savings from both a social and environmental perspective. For example, secondary materials can be used to replace primary resources and to therefore delay or prevent their depletion. The use of waste by-products in manufacturing and industrial processing can also provide savings in energy expenditures and therefore once again, help to conserve existing natural resources.

The use of secondary materials can also reduce the costs associated with conventional solid waste collection and disposal methods, as well as environmental clean-up. As a result of the decrease in the need for landfills, land could be preserved for more productive uses. The quality of the environment and aesthetics would also be improved.

The amount of money saved by industry and government each year as a result of the operation of the Canadian Waste Materials Exchange provides a good example of the social benefits of such projects. For an annual investment of $50,000, as much as 290,750 tonnes of materials, valued in terms of replacement costs, at approximately $11.8 million, are recycled. In addition, a further $7 million is saved each year in the deferred cost of landfilling this waste.

The Canadian Council of Resource and Environment Ministers' (CCREM) National Task Force on Environment and Economy recently concluded that it is no longer "appropriate to quantify all intangible values in terms of

dollars and cents, nor . . . to base all decisions solely on cost-benefit analysis" (Environment Canada, 1987). Their report also challenged industry to accept the financial responsibility for protecting the environment 'as a cost of doing business'.

Unfortunately, at the present time, the social and environmental costs associated with the exploration, extraction, production and disposal of primary materials are undervalued and are generally not included in the price of manufactured goods. As a result, no compelling financial incentives exist which could curb their use.

In contrast, because it is not possible to ignore or hide the real costs associated with the recovery, storage and transportation of waste materials, recycling programs are underutilized. Instead, government, industry and the public tend to focus on disincentives to recycling. This is especially easy to do in Canada, where there is at least a perception of an abundance of land for disposal sites and a rich supply of raw materials, as well as low and scattered population densities (Webb, 1985). These disincentives inhibit the creation of more realistic, comprehensive waste management strategies.

At the present time, the recycling industry must compete with government subsidized conventional waste disposal systems which absolve individuals and industry alike of the need to accept responsibility for their own wastes.

Another common argument against increased recycling relates to potential negative impacts on the development of natural resources. In fact, it is doubtful that a comprehensive recycling program would have more than an

incremental impact on the resource gains associated with this development. In the long term, it may even be beneficial to postpone the extraction of these materials.

10.3 Summary

Based on the findings of several recent Canadian studies:

- Despite increasing public awareness of recycling alternatives and the social and environmental problems associated with conventional waste disposal methods, many attitudinal barriers exist which limit the success of programs such as waste exchanges.
- The reuse of wastes can conserve energy and raw materials, minimize waste disposal problems and even create new jobs.
- Unfortunately, due to present circumstances it is often easier to focus on the disincentives rather than the benefits of recycling programs such as waste exchanges.

PART IV - DEVELOPMENT OF RECOMMENDATIONS

11.0 SCENARIOS FOR FUTURE WASTE EXCHANGE PROGRAMS

12 0 RECOMMENDATIONS

11.0 SCENARIOS FOR FUTURE WASTE EXCHANGE PROGRAMS

PART IV - DEVELOPMENT OF RECOMMENDATIONS

11.0 SCENARIOS FOR FUTURE WASTE EXCHANGE PROGRAMS

Based on the findings of the waste exchange survey and discussions with representatives of government and industry, we have identified three potential scenarios for the future of waste exchange programs in Canada.

The first scenario would involve a continuation of the status quo in which most exchanges are chronically underfunded and must expend a great deal of effort in order to maintain minimal levels of financial support. The second scenario would involve a long term commitment by government to provide a base level of funding which in turn, would allow the exchanges to pursue a more effective, pro-active mode of operation. Although somewhat similar to this, the third, preferred scenario, would involve a high initial level of government support, diminishing over a period of five years. In this scenario, the level of funding from industry would be expected to increase to compensate for the loss of government support until, by the end of the interim period, it had assumed complete financial responsibility for the operation of the exchanges.

In order to develop and then assess these three scenarios it was first necessary to examine the key requirements for the operation of a successful waste exchange. These requirements as derived from previous sections, include:

- a pro-active approach to the exchange of wastes

- non-profit status
- development of a business plan in which the objectives and plan of operations for the exchange are outlined
- regular review of the effectiveness of the exchange based on the business plan
- follow-up of waste exchange transactions and de-listings
- geographical coverage that reflects an industrial base adequate to support the activities of the waste exchange
- a marketing strategy focussed on potential clients of the exchange, including generators and users of waste materials
- a long-term commitment of a base level of funding
- a supportive policy/regulative/legislative atmosphere
- an adequate level of staffing (ideally 2.5 full-time staff possessing both technical and administrative skills)
- access to outside technical expertise
- bimonthly publication of a listings bulletin
- inclusion of hazardous as well as non-hazardous waste listings
- maintenance of an arms length approach and the option of confidential listings
- an on-line connection to a North America-wide computerized database

11.1 Scenario #1: The Status Quo

The following factors have been identified as typical of most current waste exchange programs:

- passive or active mode of operation

- non-profit status
- lack of business plan or framework for monitoring effectiveness
- inability to maintain records regarding listings, inquiries, and transactions, particularly with respect to on-going transfers
- provincial/state or regional/national coverage
- absence of a marketing strategy
- some level of government support
- inadequate level of funding
- staff shortages
- limited technical, administrative and/or marketing expertise
- periodic publication of listings bulletin
- arms length approach to industry
- computerized databases.

11.2 Scenario #2: Long Term Government Support

The following criteria have been identified as key components of a program involving a commitment by government to long term financial support:

- pro-active mode of operation
- non-profit status
- business plan containing objectives and goals which would provide framework for measuring success
- regional coverage determined by size of industrial base
- base level of on-going funding of $100,000/year (see Figure 11-1)

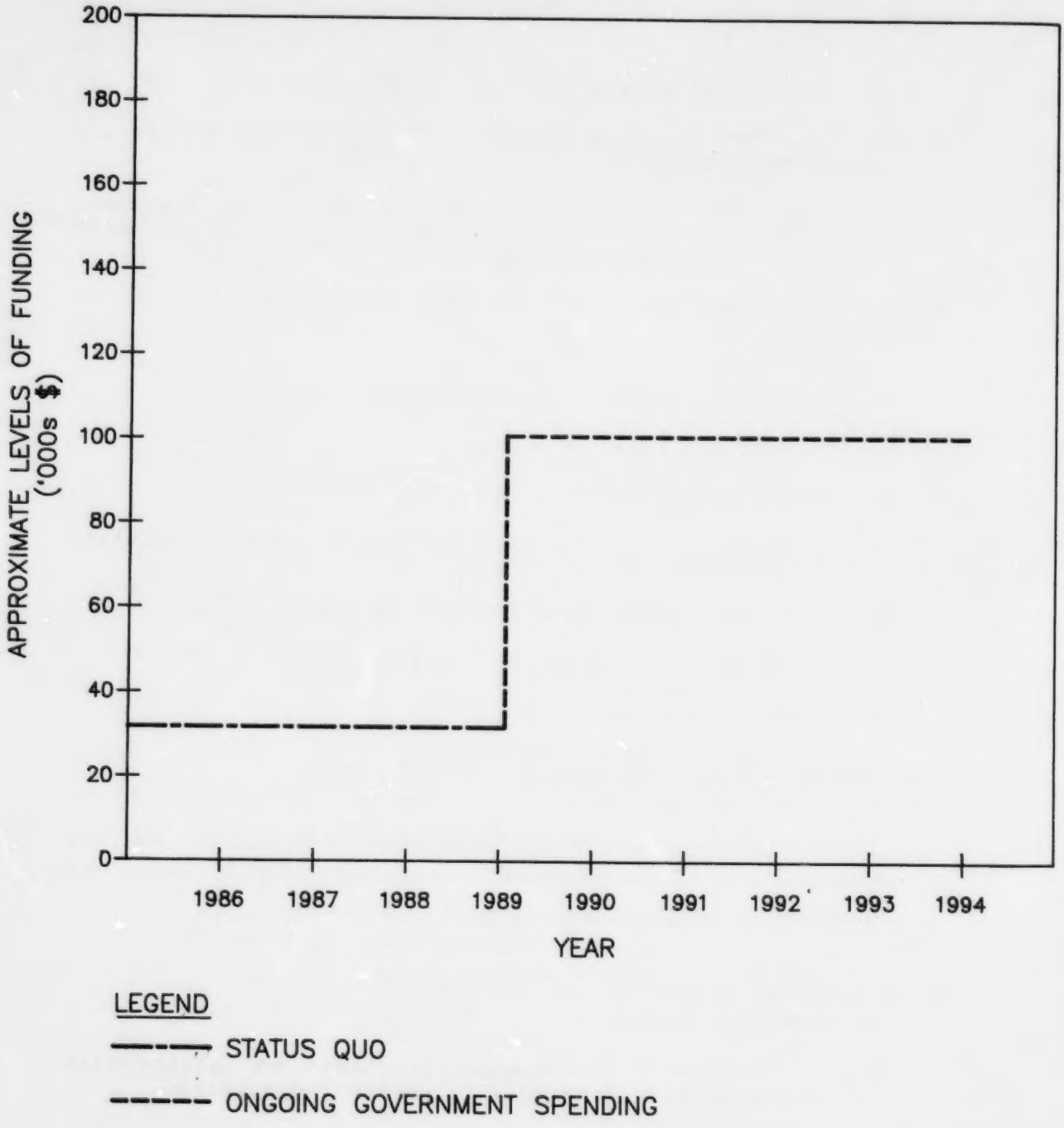

FIGURE 11–1

LEVEL OF GOVERNMENT FUNDING
SCENARIO # 2

- operate as part of a comprehensive waste management program
- well developed marketing strategy
- 2 to 2.5 staff and a computer
- operated in conjunction with research organizations capable of providing technical support
- periodic publication of listings bulletin
- arms length approach to industry
- computerized databases

11.3 Scenario #3: Diminishing Government Support

Scenario #3 would be characterized by many of the same criteria as Scenario #2, however, government funding would be diminished over time as industry accepted greater, and eventually, ultimate financial responsibility for waste exchange operations. Figure 11-2 illustrates the level of government funding required over the interim five year period.

In the initial five year period, government would have virtually complete financial and administrative control over the operation of the waste exchanges through the provisions of the funding agreement. Beyond this period, government control will decrease but is still possible. It is suggested, however, that an advisory council be formed to oversee the long-term direction and planning of waste exchange activities. The advisory council could consist of representatives from the following groups:

- Provincial Government(s)
- Municipal/Regional Governments

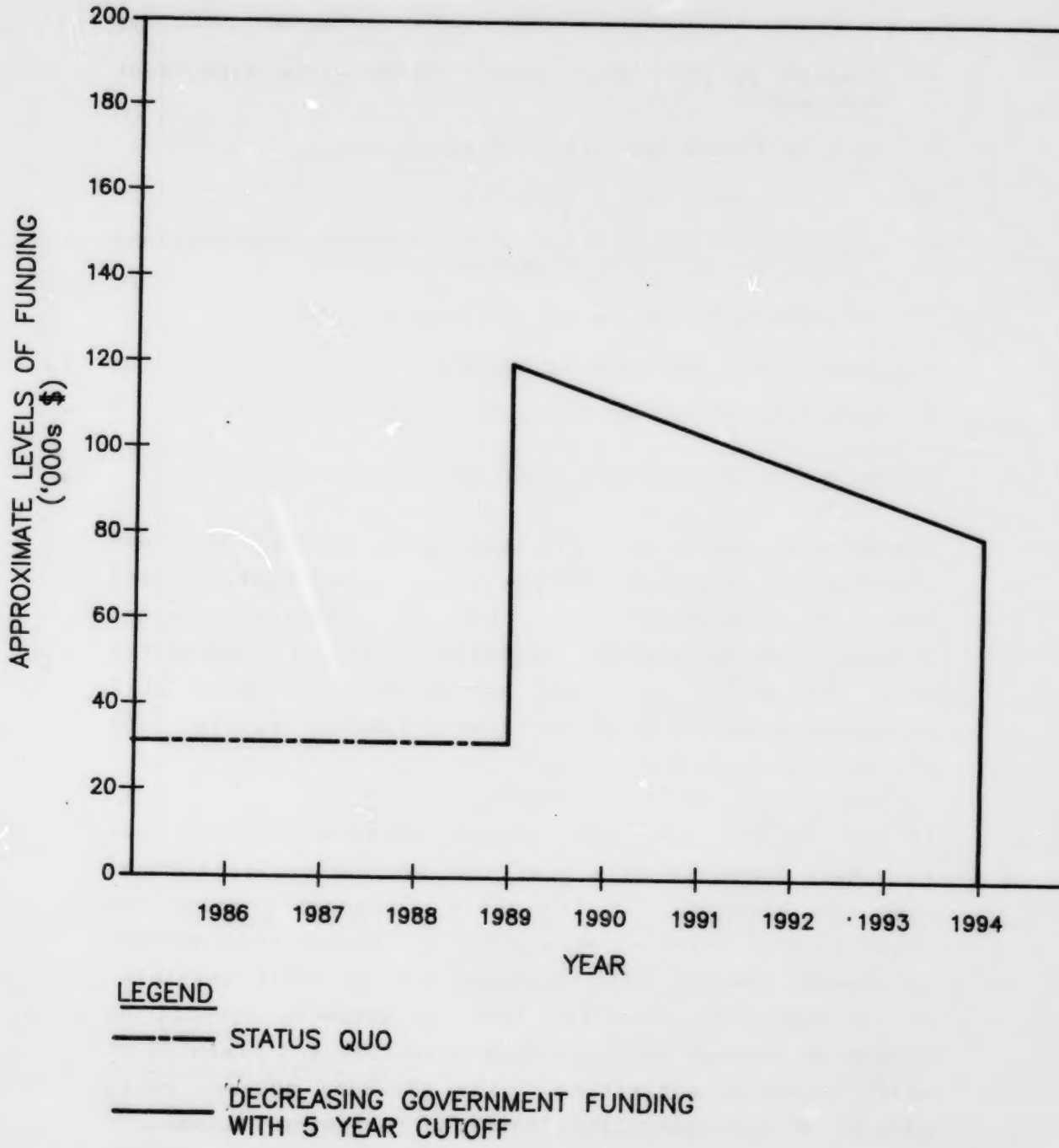

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FIGURE 11

LEVEL OF GOVERNMENT FUNDING SCENARIO # 3

- Waste Generators
- Waste Users
- Educational/Research Institutes
- Environmental Groups

Representation should be such that industry interests represent half the membership of the council. Industry representatives could be sought from the membership of organizations such as the Canadian Manufacturers' Association, Canadian Chemical Producers' Association, etc.

During the interim five year period, the waste exchanges would operate in a similar fashion to that envisaged for Scenario #2. The major difference relates to funding. Government funding would decrease from $120,000 in year one to $80,000 in year five. The initial high level of funding would enable the waste exchanges to actively seek alternative sources of funding such as advertising, seminars, publications, consulting, etc., without jeopardizing day-to-day operations. Over the five year period, the exchanges should be able to develop these other sources such that combined they can provide $50,000 per year on an ongoing basis from year six and on.

The remaining $50,000 per year would come from membership fees from generators of hazardous wastes. As discussed in Section 12.0 of this report, generators of hazardous wastes should be required to join the regional waste exchange as a condition of their waste management permit. Figure 11-3 provides a graphical representation of the level of proposed industry funding.

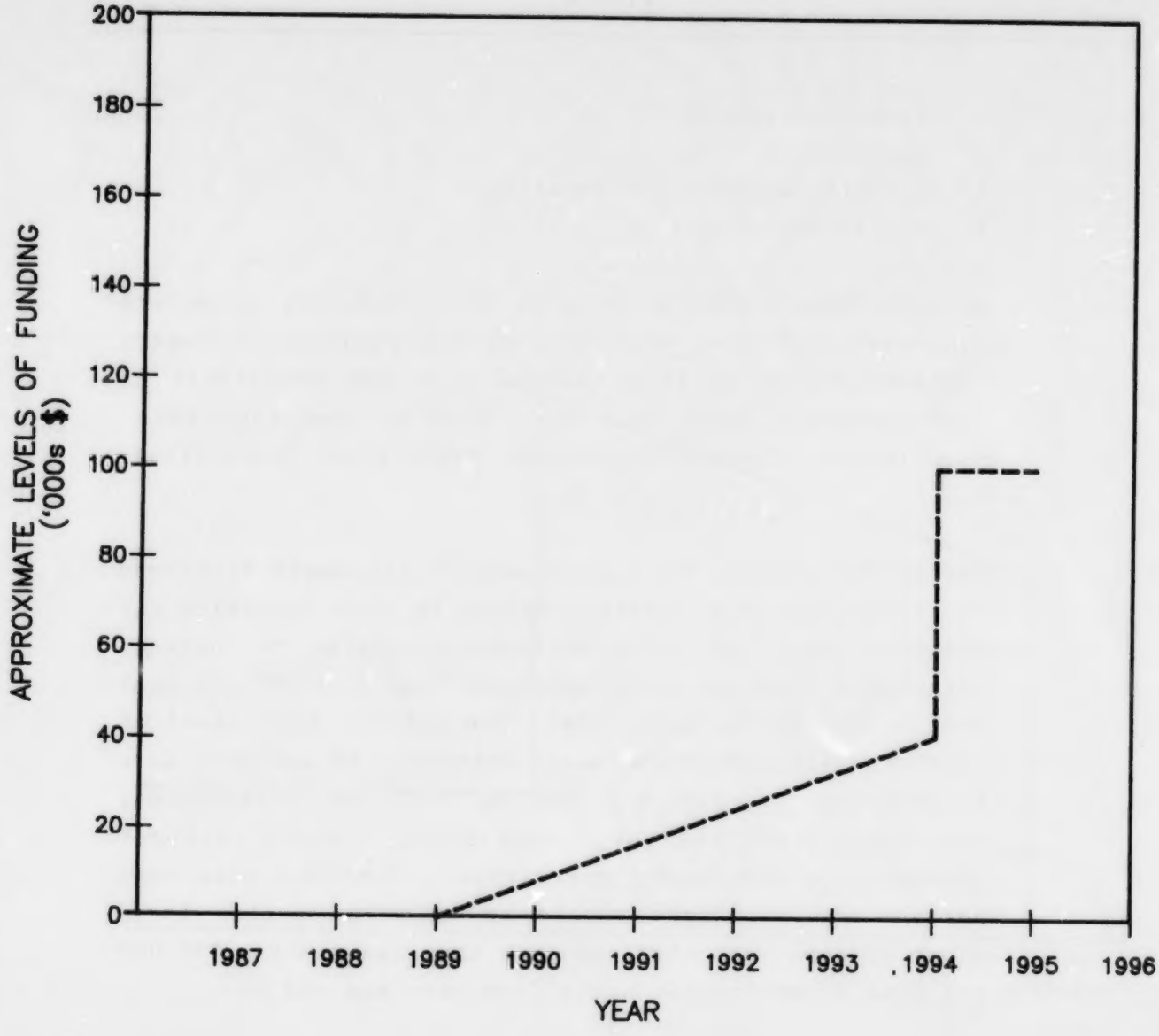

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FIGURE 11-3

LEVEL OF INDUSTRY FUNDING
SCENARIO # 3

A realistic goal for sources of funding is as follows:

Source	Percentage
Membership Fees	50
Advertising	15
Seminars/Publications	15
Subscription Fees	10
Consulting	10

11.4 Discussion

Industry currently releases many of its wastes into the environment, via landfills, incinerators and sewers. The long term social and environmental costs of these disposal practices are only beginning to be understood. Most waste exchanges are prevented from realizing their full potential as pro-active operations that could more effectively assist industry in alleviating many of these problems by actively promoting recycling initiatives.

A base level of funding, such as that provided for in Scenario #2 and #3, would allow a given exchange to meet most, if not all, of the key requirements which we have identified as necessary for the success of a waste exchange program.

In the absence of a threatened lapse in funding, for example, staff time could be used more efficiently to develop marketing strategies, offer technical assistance and undertake more outreach programs. As a result of increased personal contact with representatives of industry and active assistance during transfer negotiations, it would be possible to effect more exchanges of

waste materials. It would also be easier to keep track of on-going transfers between companies that had originally been matched by the exchange. This information could in turn be used to provide a more accurate assessment of the exchange's role in reducing the social and environmental impacts associated with conventional methods of waste disposal. As a result, the overall accountability of each waste exchange would be increased.

A base level of funding would also permit exchange operators to hire support staff who, in consultation with industry, could assist in the development of new programs and services, many of which could be used to generate additional revenues. As industry became increasingly aware of the potential economic rewards of its participation, the profile and credibility of the exchange program would grow.

Scenario #2, however, also has some important disadvantages. Short electoral mandates, for example, often prevent governments from committing themselves to the provision of long term funding. In addition, the public is becoming increasingly critical of new government programs which provide benefits to industry which they feel is quite capable of providing for itself. As a result, less and less government money is available for programs such as those involving waste exchanges, which although ultimately benefiting all of society, currently provide a direct benefit to industry.

Because Scenario #3 involves diminishing government involvement over a set period of time it has been identified as the preferred alternative. It has several advantages over Scenario #2. The funding of waste

exchanges by industry, would ensure financial stability of those operations by making them independent of the constraints and vagaries of government funding. In addition, it would ensure that the level of performance of the exchange would be consistently high due to the requirement for greater accountability over time. Furthermore, the credibility of such programs and of industry in general, would be immeasurably increased as companies were perceived by the public as taking more responsibility for both the short and long term environmental problems associated with the management of its wastes.

There are many possible permutations of the above scenarios, including a program involving joint funding by government and industry should full funding by the private sector fail to materialize. In our view, Scenario #3, however, remains the most favorable option and it is on that basis that the following recommendations have been developed.

12.0 RECOMMENDATIONS

12.0 RECOMMENDATIONS

As described in Section 11.0, we have developed a preferred scenario for the future of Canadian waste exchange programs. Based on the findings of this study we have also developed a series of recommendations describing the roles of respective parties in the successful achievement of such a scenario.

For ease of presentation, our recommendations are structured as follows:

- organization of a Canadian Waste Exchange System
- funding of the exchange system
- operation of regional waste exchanges
- role of government
- role of industry.

While some of our recommendations may overlap within these five broad areas, we believe that the distinction results in a better form of presentation.

12.1 Organization of a Canadian Waste Exchange System

The apparent tendency of the waste exchange system in Canada at present is to develop a series of regional exchanges under a larger umbrella organization, the Canadian Waste Materials Exchange. We believe this to be a logical development, an efficient means of utilizing limited financial resources, and an approach that should be fostered.

Recommendation #1

A three-tiered Canadian Waste Exchange System should be developed.

The mode of operation, responsibilities and key activities of each of the components would be as follows:

Tier 1 - Canadian Waste Materials Exchange

- annual budget of $50,000
- funding to come from regional waste exchanges and revenues from seminars, publications, courses, etc.
- mode of operation to be passive
- primary responsibilities to be the coordination of the efforts of the regional waste exchanges and liaison with government and key sectors of industry on their behalf
- key activities to include:
  - development of long term funding mechanisms for all of the exchanges
  - development of standard methodology for monitoring the effectiveness of the regional exchanges
  - development of an integrated, national or international database
  - standardization of waste listings and format of bulletin
  - collection and distribution of relevant information and research results to industry
  - lobbying of industry and government
  - coordination of international activities
  - sponsorship and organization of seminars, conferences and courses on waste exchanges.

Tier 2 - Regional Waste Exchanges

- annual budget of $100,000/exchange
- exchanges to be created or restuctured which would be capable of serving:
  - British Columbia/Yukon
  - Alberta/Northwest Territories
  - Saskatchewan/Manitoba
  - Ontario
  - Quebec and Labrador West
  - Maritimes and Island of Newfoundland
- mode of operation to be pro-active
- primary responsibility to be to actively pursue the matching of generators and users of waste products
- key activities to include:
  - maintenance of computer databases
  - publication of bi-monthly bulletins
  - direct contact with industry and industry groups regarding waste management issues related to recycling
  - development of education programs for industry
  - consulting/marketing studies related to waste exchange.

Tier 3 - Subregional (District) Referral Services

- budget to be responsibility of local government
- mode of operation to be passive
- primary responsibility to be to liaise with local industry
- key activities to include:
  - distribution of information on waste exchanges
  - forwarding inquiries to waste exchanges
  - seeking local input on matters involving waste exchanges.

It should be apparent that parts of this system, including the Canadian Waste Materials Exchange and four of the provincial exchanges, are already in place.

This recommendation would however, involve a change in the status of the Canadian Waste Materials Exchange. It would no longer handle listings and inquiries but instead would assume the role of a national coordinating body. Its current activities would be handed over to the regional exchanges which will operate pro-actively. Standardized listings and access to a national database would ensure that the services offered by these were not exchanges limited by provincial or territorial boundaries.

Staff employed by industry or government at the municipal or district level would act as conduits of information between industry and the regional exchanges. The provision of this information would represent only one component of their overall duties. At the present time this type of service is already provided at the local level in certain regional districts and municipalities of Ontario.

Recommendation #2

During the interim five year period, all regional waste exchanges should be operated at arms-length from government in order to ensure confidentiality.

Past experience, particularly in the United States, has shown that industry is reluctant to participate in waste exchanges that are perceived to be run by government because of potential conflicts with regulatory agencies over waste management practices. Exchanges operated under contract to private, non-profit organizations on the other hand, have been more successful due to their ability to offer confidential listings

and to eliminate the possibility of government 'meddling'.

Although Canadian industries are less concerned about the need for confidentiality then their American counterparts, due primarily to differences in liability laws, the options of an arms-length approach and the use of confidential listings should be made available in order to ensure that all potential disincentives to recycling have been removed.

Recommendation #3

The waste exchanges should be an integral component of a broader waste management program.

Many experts have labeled waste exchanges as the 'orphaned child' of government waste management policy or the 'alternative of last resort' for industry. In a society which has expressed serious concern about conventional disposal methods for hazardous wastes and the depletion of natural resources, these comments are somewhat difficult to understand.

Recycling should be much more attractive than incineration or landfilling. It should be part of a broader waste management program involving reduction, recovery, reuse, recycling and disposal. Significant social and economic benefits accrue to Canada from recycling waste products. These benefits currently go unrecognized because the substantial costs of externalities such as pollution and health problems created by conventional methods of waste disposal are not directly measurable and consequently remain hidden. These costs will undoubtedly be borne by society in the not too distant future.

12.2 Funding of The Canadian Waste Exchange System

Waste exchanges require a guaranteed base level of funding in order to realize their full potential as pro-active operations. This funding should be provided by government and industry over an interim period of five years. During that time industry's financial contributions should increase in proportion to diminishing levels of funding from government. At the end of five years, industry should accept total financial responsibility for the Canadian Waste Exchange system.

Potential mechanisms for raising these funds include the application of a compulsory membership fee to the local waste exchange as part of the registration requirement for all generators and private waste management facilities and/or the imposition of a tax on all hazardous waste generators that do not participate in recycling programs. Supplemental sources of funding could be derived through the provision of consulting services and seminars related to waste management, the application of subscription fees and the acceptance of commercial advertisements for the waste exchange bulletin and the donation of grants from individual companies. Each of these funding mechanisms is considered in more detail in subsequent recommendations.

Recommendation #4

Regional governments should provide funding at an initial level of $120,000/year/exchange during the first year of the new program. Over the course of the next four years this amount should decrease by $10,000 annual increments. At the end of five years this government funding should be discontinued.

Based on the findings of this study, and corroborated in Environment Canada's 1986 discussion paper, the effective operation of a waste exchange requires at least $100,000 per year. The higher level of funding at the start of the new program would allow waste exchanges greater flexibility in setting up long term funding arrangements in the first few years of their operation and would also provide the incentive required for operators to secure additional funding.

The source of these government funds may include revenue generated through permit fees for the operation of treatment, storage and disposal facilities and/or taxes levied against hazardous waste generators. It may also include money held in provincial waste management trust funds such as those described in current waste management regulations in British Columbia and Ontario. The designation of such funds would require an amendment to these provincial regulations specifically prescribing their use in supporting waste exchange programs.

During the interim period of five years, industry's contribution to the operation of the waste exchange program should increase to replace the funds being withdrawn by government in order to insure a base level of funding of at least $100,000 per year.

Recommendation #5

At the end of the five year period, industry should assume complete financial responsibility for the waste exchanges, ensuring a base level of funding of $100,000 per year.

Recommendation #6

In order to provide a funding mechanism that will ensure this base level of support, all generators of hazardous or special wastes should be required to pay an annual membership fee to their local waste exchange as part of their registration requirement. In addition, the permitting process for all storage, recycle, treatment and disposal facilities should include a similar requirement.

Most provinces currently have or are about to introduce waste management regulations which would require the registration of all generators of hazardous wastes. Similarly, most have outlined a permitting process for all waste management facilities. In several cases, these regulations also contain provisions that would allow the provincial waste manager to set additional standards of compliance for prospective permittees, that are not explicitly described within current legislation.

These regulations could be used to introduce compulsory payment of membership fees to the regional exchanges, ensuring a base level of funding for these operations.

As a result of these payments, each generator and each operator of a waste management facility would be put in direct contact with their local exchange. While the payment of membership fees would provide an incentive to participate, listing of wastes in the exchange bulletin, would not be compulsory. As a consequence, problems such as those that arose in Illinois with the passage of the 'Land Ban' law, involving large numbers of listings of non-recyclable materials, will be avoided.

The level of the membership fee should be set across the board rather than in terms of volume or quantity of

wastes produced or handled in order to prevent companies from minimizing the amount of wastes reported.

Provinces that do not currently have regulations describing generator registration requirements and a permitting process for waste management facilities would need to introduce such legislation in order to facilitate this funding mechanism.

Recommendation #7

Supplementary sources of funding could reduce the base level of funding that is required and should be sought from revenues generated through:

- **Subscription Fees**
- **Seminar Fees**
- **Consulting Fees to Industry and Government**
- **Advertising**
- **Industry Grants**

The waste exchanges should be required to seek additional funds from other sources to reduce the base level of funding that is required and if appropriate, to finance more extensive programs and services. Some exchanges, for example, already accept paid advertisements in their bulletins. If common sense and editorial control are exercised, advertising can bring in significant revenues from consultants, transporters, waste brokers and other groups.

Some waste exchanges already charge for seminars and educational programs. While generating revenue, these activities are also effective marketing tools. There may also be a market for technical publications on waste recycling which could be sold on a cost-recovery or profitable basis.

All of these, and other options should be considered.

Recommendation #8

A joint industry/government advisory council should be formed to provide long-term guidance to the waste exchanges.

Following the lapse of direct government funding, an advisory council should be formed to provide long term guidance and planning for each regional waste exchange. The advisory council would replace the control over waste exchange operation previously dealt with in the government funding agreements.

The advisory council should consist of representatives from the following groups:

- Federal Government
- Provincial Government(s)
- Municipal/Regional Governments
- Waste Generators
- Waste Users
- Educational/Research Institutes
- Environmental Groups

Industry representatives should account for half of the advisory council membership, due to their provision of the funding.

The advisory council would have perhaps 12 members, plus the director of the regional waste exchange. Meetings would be on a quarterly basis and would deal with programs, reviews of operations and planning.

The Canadian Waste Material Exchange would have an advisory council as well, consisting of the directors of each of the regional waste exchanges and the director of the CWME.

12.3 Operation of Regional Waste Exchanges

While most waste exchanges are reasonably effective considering their present level of funding, a change in orientation in management and operation is required to make them more responsive, effective and accountable.

Recommendation #9

All regional waste exchanges should be required to develop a statement of objective and a business plan.

Very few of the waste exchanges have a clear, concise written objective and a plan for obtaining that objective. If they were private corporations many would have failed, not from lack of good product, but rather from poor management.

Prior to receiving funding, a waste exchange should be required to produce a broad statement of objectives outlining what it intends to accomplish. It should also be required to set out a series of well-defined, phased goals describing quantitative targets of volumes of wastes to be exchanged as well as the content of additional programs and services.

The business plan should include:

- proforma budgets

- a market assessment
- a marketing plan
- a means of reviewing performance.

Recommendation #10

Waste exchange staff should be hired on the basis of their management and technical expertise.

Ideally each waste exchange should engage the equivalent of two to two and one-half full time staff including persons with the following skills:

- technical (science, chemistry, waste management)
- administrative/marketing
- communications/computer programming.

In addition, secretarial support staff should be sought to supplement the efforts of these employees, perhaps on a part-time basis. Such an arrangement would enable the technical expert to become directly involved with industry, while ensuring that administrative matters such as the distribution of publications, were adequately addressed.

Recommendation #11

A greater effort should be made in the area of marketing waste exchange services.

Funding problems in the past have resulted in the use of a less-than-effective marketing approach. With additional funding and technical resources, this could change. A marketing plan should be developed to encompass the following:

- review of the local industrial base
- identification of opportunities for recycling waste
- review of the needs of industry
- direct contact with key companies and industries
- focus of efforts on target industry sectors
- preparation of promotional literature
- development of educational packages and programs
- participation in broader waste management programs
- provision of technical advice.

Recommendation #12

The waste exchanges should develop a standard methodology for assessing the value of waste products exchanged.

The development of this methodology should be undertaken in conjunction with the Canadian Waste Materials Exchange. It must be related to each exchange's overall objectives and should provide a means of measuring the degree to which specific goals are being met.

The value of waste products exchanged may be assessed in terms of:

- replacement cost for raw materials and/or
- deferred disposal costs.

At an industry specific level, it may also be possible to assess the value of these exchanges in terms of energy savings.

Putting a value on these exchanges could in turn:

- provide a means of measuring the effectiveness of a given waste exchange

- enhance the perceived benefits of waste exchange services in the eyes of industry

- provide a means of measuring benefits to the public in the areas of protection of human health and the environment, and resource conservation. In addition, the value of exchanged wastes may also be considered in terms of creation of employment in recycling, generally a labor intensive activity.

Recommendation #13

The waste exchanges should track the on-going exchange of wastes and follow-up on inquiries and de-listings.

Many of the exchanges contacted indicated that a substantial volume of waste product trades outside the exchange once an initial matching of generator and user has been made. Some means of monitoring these on-going exchanges should be developed as they reflect positively on the success and effectiveness of the exchange.

Since information on the fate of all wastes is of interest to governments, waste exchanges could undertake on-going studies involving follow-up on inquiries and de-listings on a 'for fee' basis.

Recommendation #14

Develop the National Waste Exchange Database.

With the assistance of the Canadian Waste Materials Exchange, all regional exchanges should work towards the creation of a North American-wide computerized database. This would result in the more rapid transfer of technical and listings information among exchanges and the provision of a more up-to-date service to industry. Furthermore, standardization of listings would facilitate

transfer of information among exchanges, could result in the design of a more cost-effective format for bi-monthly bulletins, and could stimulate longer distance exchanges of high value wastes.

12.4 The Role of Government

In order to enhance the potential effectiveness of waste exchanges, government must pass legislation and/or regulations that will make waste management options involving responsible alternatives such as recycling, more attractive.

Recommendation #15

Governments should encourage participation by industry in comprehensive waste management programs.

Governments should exercise a leadership role in the development of waste management plans. At the present time, recycling is often viewed as the option of last resort. More attention is given to conventional practices such as the disposal of wastes in landfills or by incineration, than to either source reduction or waste minimization. We believe that recycling would become more attractive if it were part of a formal waste management program with an effective level of funding and staffing. The program initiated by the Ontario Waste Management Corporation may be a good model in this respect.

Recommendation #16

Government should actively interact with the waste exchanges through the provision of technical expertise, technological support and on-going liaison.

At the current time many governments are short-staffed and lack sufficient funding to administer comprehensive waste management programs. They may however, be able to provide marketing or other non-monetary support for waste exchanges. In addition, technical resources and expertise could be made available on an as required basis to provide back-up and answer technical inquiries generated as a result of the exchange's contact with industry.

Such interaction should improve the effectiveness of the waste exchanges, provide government with good information regarding the exchange of wastes, particularly hazardous wastes, and result in more effective waste management programs.

Recommendation #17

Governments should ensure that the fees charged for services such as incineration and landfilling reflect the true long term economic costs of maintaining, monitoring and de-commissioning waste management facilities.

Recommendation #18

Governments should explore the possibility of imposing a tax on hazardous waste generators.

Recycling could become a more attractive option through the adoption of appropriate fiscal measures such as:

- the imposition of a tax on hazardous wastes
- provision of a rebate of the tax if the hazardous wastes are re-used or recycled.

The above measures would result in an incentive to reduce the volume of hazardous wastes generated, provide an

incentive to re-use or recycle, and, combined with Recommendation #16, make the least environmentally desirable options (landfilling, incineration) less attractive.

Allowing for some flexibility to reflect the needs of small generators, the period of on-site storage should be restricted and its violation subject to a penalty charge.

The collection of fees and taxes through such an arrangement should provide governments with funds to utilize in waste management programs, including base level funding for waste exchanges in the interim five year period.

Recommendation #19

Government should examine the potential for using tax credits, accelerated capital cost allowance and other fiscal measures to encourage research and development, and the use of new technologies for utilizing waste products in place of virgin resources.

The two previous recommendations dealt with means of making recycling more attractive from the supply side of the equation. To enhance this, incentives may also be required on the demand side. We have not evaluated these options in any detail however, as they are the subject of another study entitled "Barriers to the Recovery and Recycling of Hazardous Wastes" currently being conducted by TRI Technology Resource Inc.

Recommendation #20

Governments should develop a standard definition of what constitutes a hazardous waste and determine under what circumstances recyclable material should be exempted from hazardous waste and goods legislation.

At the present time, there are significant differences in the way in which recyclable materials are handled by legislation between the provinces. In Ontario, for example, wastes that do not require storage or pre-treatment and that are directly recycled from the generator to the user, are exempted from the Environmental Protection Act - General Regulation 309. Similarly in B.C., generators of wastes which are recycled on-site without storage are exempted from registration requirements. This type of legislation promotes the use of waste exchanges by providing an incentive to industries that want to avoid extra paper work and perceived government bureaucracy.

No such special treatment, in contrast, is given to recyclable materials in any of the other provinces. Furthermore, interprovincial movements of such materials are still covered by the Federal Transportation of Dangerous Goods Act. As a result, there is the potential for confusion and jurisdictional disputes which could in turn provide a disincentive to transprovincial exchanges. At the federal level, a Transportation of Dangerous Goods Act amendment package is currently being drafted which will permit the manifesting of recyclable wastes to be optional at the discretion of provincial jurisdictions. This will considerably alleviate the disincentive to the trans-provincial exchange of wastes.

When developing a standard definition of hazardous waste, care should be taken to avoid problems such as those that have arisen as a result of the complex language contained in the U.S. Resource Conservation and Recovery Act (RCRA).

12.5 The Role of Industry

While our discussions with industry revealed some interest in recycling and the existence of a few on-going recycling programs, for the most part there was a lack of interest and knowledge in this area. Several of the associations contacted were unaware of the existence of waste exchanges.

The future involvement of industry in national and regional waste exchange programs is critical.

Recommendation #21

In light of proposed funding arrangements, industry should be expected to provide some interim funding and a base level of funding for the Canadian waste exchange system after a period of five years.

As previously described, this funding would be provided through annual membership fees collected from all hazardous waste generators and waste management facilities.

Other potential roles for industry with the exchange program could include:

- participation on advisory boards
- developing new sources of funding

- participation in research on recycling
- development of educational packages.
- technical support
- marketing support
- suggestion of useful programs and services.

12.6 Other Issues

In addition to the recommendations listed above which deal primarily with methods of improving the effectiveness of waste exchanges, measures should also be taken to limit their range of activities.

Recommendation #22

The waste exchanges should cooperate, rather than compete with the commercial brokers.

An overall objective of the waste exchanges should be to encourage all recycling endeavors. Currently, the exchanges and brokers have a good relationship and in many instances the brokers utilize the services of the exchanges. Therefore, although waste exchanges do handle some products wanted by brokers, few conflicts occur since the non-profit exchanges are not interested in taking business away from the brokers. Furthermore, waste exchanges, unlike brokers, should continue to avoid situations in which ownership of, and therefore liability for a waste material, is assumed.

Recommendation #23

The waste exchanges should not duplicate services offered elsewhere or undertake programs that would detract from operation of the exchange itself.

In order to prevent duplication of services and ineffective use of scarce funds, waste exchanges should not engage in services that are better offered elsewhere. It may be beneficial to consider a joint effort between appropriate parties, which could improve the quality of service and result in greater cost effectiveness.

An exchange should also avoid engaging in activities that will limit its ability to attain the primary objective of matching waste generators and potential users. This is particularly important if staff time and funding is limited, and participation in other activities will take resources away from the prime activity of the exchange.

Recommendation #24

Waste exchanges should not be involved in what could be considered environmental activism.

In order to maintain credibility and ensure the fullest possible government and industry support, waste exchanges should steer away from issues in which any response or support would result in a perception of an activist role. While funding or support organizations could be involved in this area, the waste exchange should distance itself from such activities. This recommendation would not preclude the participation of representatives from environmental groups, along with those from industry, government and educational institutions, in advisory councils for the waste exchanges.

APPENDICES

APPENDIX A
Terms of Reference

TERMS OF REFERENCE
for a
Report on Waste Exchange Programs

Description

To conduct a review of waste exchange programs in Canada, the United States and abroad for the purpose of evaluating ways and means of expanding their use and productivity to achieve greater hazardous waste reduction on a national basis and to improve their financial self-sufficiency.

Purpose

The purpose of this study is to examine the effectiveness of waste exchanges in reducing the quantity of wastes that would otherwise require treatment and disposal and to recommend means of improving their effectiveness in achieving this goal. Recognized existing waste exchanges in Canada, U.S. and abroad, for which suitable operating data are available, are to be reviewed and analyzed for features that enhance waste reduction goals. The study is to identify opportunities for maximizing the use of waste exchanges in Canada and to increase their level of financial self-sufficiency. Technical, legal, financial and informational initiatives to enhance existing programs or put into place new ones are to be outlined.

Background

Waste exchanges are operations in which a middleman arranges for the transfer of waste generated from one company to be used as raw materials in the operation of another company.

Benefits resulting from such operations are numerous and include reductions in waste disposal requirements, environmental impact, waste management costs and consumption of resources.

In 1978 Environment Canada commissioned the Ontario Research Foundation to start up the Canadian Waste Materials Exchange. In 1984 an Ontario Waste Exchange was initiated and operates in conjunction with the Canadian Waste Materials Exchange. This was followed by a Manitoba waste exchange in 1984 and one in Alberta in 1985. More recently, waste exchanges have also been started up in the regional municipalities of Peel and Kitchener-Waterloo. Although it is considered somewhat early to assess the success of most of the exchanges mentioned above, the operation of the Canadian Waste Materials Exchange is considered to be an unqualified success, having recycled an average of 220,000 tonnes of waste a year at an annual operating cost of $50,000. However, increased benefits are considered achievable if the number of actual exchanges, particularly of hazardous wastes, can be increased and if a greater level of financial self-sufficiency can be achieved.

Scope

It is proposed that at least 15 existing well known and successful passive and active waste exchanges be examined including the six currently operating in Canada. The others are to be chosen from among successful exchanges currently operating in the United States and overseas.

For the purpose of this report a passive waste exchange is one which does not seek out potential users but waits for waste users to come forward. Waste generators and users are brought together but negotiations take place outside the control of the waste exchange. An active waste exchange is one which goes out and seeks potential users, provides technical information and assists in consummating a contract between the waste generator and potential user.

In 1986, a study entitled "The Development of an Information Data Base for the 4 R's Program" was completed for the Saskatchewan Department of the Environment by the Saskatchewan Research Council. This study included an examination of waste exchanges in Canada and the United States and a good portion of the work carried out overlaps with the work elements of this project. The results of this study will be made fully accessible to the successful bidder.

It is not intended that the following statement of work be complete or all inclusive. The proponents are expected to identify and propose any additional work elements which they feel would enhance the quality of the study.

Statement of Work

This study is to include the following work elements:

1. Define the various program concepts for the exchanges studied including whether active or passive, method of financing, private or public ownership, confidentiality considerations, type of publication, and other comparable features.

2. Identify the types and quantities of materials exchanged by grouping and by classification as to hazardous or non-hazardous characteristics, and where relevant information is available, evaluate material values, stability of supply and demand, economies of scale. The definition of hazard wastes as defined in the federal Transportation of Dangerous Goods Act is to be used, to the extent practical, to identify hazardous waste.

3. Describe relevant transportation factors such as means of transport, exchange distances, limitation or restrictions introduced by transportation of dangerous goods regulations and evaluate their impact

on the efficiency of waste exchange operation. The impact of inter-provincial or international regulations on the transboundary movement of waste materials is to be included.

4. Legal considerations and trends influencing waste recycling and reuse vs. use of virgin material are to be examined and evaluated. The contribution to the success of waste exchanges versus the barriers to such success created by increased regulatory control (such as Ontario's Bill 309), including relevant cost factors, are to be included.

5. Assess the need for long term funding mechanisms as well as the comparative benefits of the provision of financial incentives through taxation, grant funds, disposal costs, membership fees, transaction fees, in the operation of waste exchanges.

6. Assess the success achieved by and the need for educational programs to promote the utilization of waste exchanges.

7. Define the expectations of industry, both as users and generators, from waste exchanges and identify and evaluate those factors such as: costs, convenience, use of secondary materials vs. virgin materials, availability, location of wastes, which influence such expectations or discourage the exchange of waste. The economic influence of on-going market variability and virgin materials cost fluctuations is to be addressed.

8. Evaluate the role of waste exchanges in identifying, stimulating, and undertaking technical development relevant to new uses for hazardous wastes.

9. Define or suggest how to best monitor the effectiveness of waste exchanges. Provide a comparative analysis of active versus passive concepts for the operation of waste exchanges with reference to such variables as degrees of advice and assistance provided, follow-up on requests, information provided, marketing efforts, confidentiality.

10. Assess the present role of governments and that of the private sector in operating or assisting waste exchanges, identify trends in these roles, and predict the roles that different governments should or will play in the future.

11. Develop recommendations for the Canadian system with emphasis on regional concepts.

<u>Project Direction and Reporting</u>

1. The contractor shall meet with the Scientific Authority at the outset of the study to review and ensure agreement with the work program.

2. A preliminary draft report (5 copies) is to be made available for review and input by the Scientific Authority and the B.C. Ministry of

Environment and Parks prior to proceeding with the broader distribution described in the following. (10 weeks from project start)

3. Draft report (30 copies) is to be submitted to the Scientific Authority for internal review by Environment Canada headquarters and regional offices as well as by the provincial waste committee members of the Canadian Council of Resource and Environmental Ministers (12 weeks from project start).

4. Review comments will be submitted to the contractor for revision of the manual.

5. Final manuals (25 copies) are to be submitted to the Scientific Authority (18 weeks from project start).

APPENDIX B
Results of Computer Search of Literature

DIALOG File 15: ABI/INFORM - 71-87/Dec, Week 2 (Copr. UMI/Data Courier 1987)

86024671
Hazardous Wastes: Some Simple Solutions
Huisingh, Donald; Aberth, John
Management Review v7En6 PP: 46-51 Jun 1986 ISSN: 0025-1895 JRNL CODE: MRV
DOC TYPE: Journal Paper LANGUAGE: English LENGTH: 6 Pages
AVAILABILITY: ABI/INFORM

Most chemical and manufacturing industries use crude or even illegal methods to dispose of hazardous wastes. However, the prevention or minimization of waste production can be a low-cost, low-risk alternative to conventional disposal. Using less toxic chemicals can be technically feasible, economically viable, and ecologically beneficial. Methods for pollution prevention and waste minimization include: 1. waste audits, 2. management initiatives, 3. housekeeping improvements, 4. material substitution, 5. equipment redesign, 6. recycling and reuse, 7. waste exchange, and 8. detoxification. Distillation, absorption, and filtration are recycling methods. Some state and local governments may provide funding for the use of some of these methods. State governments are becoming stricter concerning the abandonment of hazardous waste sites, and Congress is starting to recognize the value of waste minimization as opposed to end-of-pipe controls.
DESCRIPTORS: Hazardous substances; Waste disposal; Pollution control; Prevention; Methods; Techniques
CLASSIFICATION CODES: 1540 (CN=Pollution control)

85039050
Waste-Watching for Profit
Donev, Stef
Industrial Mgmt (Canada) v9n9 PP: 18-20 Oct 1985 ISSN: 0702-7060 JRNL CODE: IMT
DOC TYPE: Journal Paper LANGUAGE: English LENGTH: 3 Pages
AVAILABILITY: ABI/INFORM

More companies are becoming aware of the potential value of their industrial waste and are recycling it to improve their bottom lines. The Canadian Waste Materials Exchange (CWME) is a government-funded, nonprofit exchange that serves as a national clearinghouse for industrial waste producers and users. CWME (Mississauga, Ontario) publishes a monthly bulletin that lists materials and compounds that companies do not wish to keep, as well as materials that firms want. Some firms using CWME make a profit from the waste exchange, while other companies may profit from reducing their operating costs. Also, many companies have developed new procedures to treat or reduce wastes, while some firms have even developed their own uses for wastes. For example, the Ontario Paper Co. (Thorold, Ontario) found a way to make a profit from selling a product made from lignin, which it previously had to treat before dumping.
DESCRIPTORS: Industrial wastes; Recycling; Waste disposal; Brokers; Nonprofit organizations; Case studies; Canada
CLASSIFICATION CODES: 9540 (CN=Nonprofit institutions); 1540 (CN=Pollution control); 9170 (CN=Non-US); 9110 (CN=Company specific)

84018721
Waste Exchanges - An Underutilized Way to Help the Bottom Line
Rich, Laurie A.
Chemical Week v134n20 PP: 56-60,67 May 16, 1984 CODEN: CHWKA9 ISSN: 0009-272X JRNL CODE: CEM
DOC TYPE: Journal Paper LANGUAGE: English LENGTH: 4 Pages
AVAILABILITY: ABI/INFORM

An increasing number of waste exchange newsletters have been introduced to help companies that are trying to dispose of waste products. Waste exchanges, which publish such newsletters, have a huge potential market, but they must overcome a variety of problems, both concrete and psychological. While the exchanges seem like a good idea, at least 15 have folded as a result of regulatory impediments, indifference on the part of chemical companies, and bad site selections. Companies that do use exchanges can select between passive exchanges or brokerage operations. The first type is usually run by a state or local government that sees the safe disposal of waste as the primary objective. The brokerage operations are in the field to turn a profit. They will aggressively look for users for a client's waste stream. A passive exchange steps out of the picture once it has brought the companies together. Brokers stay in through the closing. Table.
DESCRIPTORS: Chemical industry; Industrial wastes; Waste disposal; Wastes; Exchange; Recycling
CLASSIFICATION CODES: 8640 (CN=Chemical industry); 1540 (CN=Pollution control)

81025001
Exchange Finds Buyers, Sellers of Factory Waste
Anonymous
New England Business v3n17 PP: 43-44 Oct 19, 1981 CODEN: NENBA3 ISSN: 0164-3533 JRNL CODE: NEN
DOC TYPE: Journal Paper LANGUAGE: English LENGTH: 2 Pages
AVAILABILITY: ABI/INFORM

Firms participating in an industrial waste exchange stand to save either the cost of waste disposal or the cost of a new raw material, and sometimes both. The firms split the costs of transportation and materials analysis; the waste exchange acts as a clearing house. Dana P. Peck, founder and owner of Peck Environmental Laboratory, Inc., a waste exchange program, says that even though federal and state regulations permit recycling programs, firms still request anonymity. If a company makes an error, it could face fines of up to $25,000 a day. There is a large amount of risk-taking in trying to recycle wastes. The administrative interpretation of new federal and state laws dealing with hazardous materials is
(cont. next page)

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still unclear. The ultimate goal of an exchange is to lessen the overall amount of hazardous waste.
DESCRIPTORS: Industrial wastes; Recycling; Hazardous substances; Programs; New England; Maine
CLASSIFICATION CODES: 1500 (CN=Energy/Environment)

81004414
They're Getting 'Gold' from Dross
Anonymous
Chemical Week v128n5 PP: 37-38,40 Feb 4, 1981 CODEN: CHWKA9
ISSN: 0009-272X JRNL CODE: CEM
DOC TYPE: Journal Paper LANGUAGE: English
AVAILABILITY: ABI/INFORM

Due to soaring energy costs and pressures created by the Resource Conservation and Recovery Act to reduce and account for waste materials, many chemical makers are seeking buyers for their co-products. Such efforts are gaining official corporate recognition as new sources of revenue. The concept of co-product utilization is not new, but it has only recently become economically feasible. In previous years, it was more profitable to dump, bury, or burn co-products. Co-products are either sold ''as is'' or are chemically upgraded or purified. Some are completely new products after being chemically treated. Another business emerging from co-products is waste exchanges, which are clearinghouses that list available co-products for sale.
DESCRIPTORS: Chemical industry; Manycompanies; By products Joint products; Marketing; Sales; Industrial wastes
CLASSIFICATION CODES: 8640 (CN=Chemical industry); 7000 (CN=Marketing); 1500 (CN=Energy/Environment)

80005132
Broker Aims to Profit from Trading Wastes
Anonymous
Chemical Week v126n9 PP: 47-48 Feb 27, 1980 CODEN: CHWKA9
ISSN: 0009-272X JRNL CODE: CEM
DOC TYPE: Journal Paper LANGUAGE: English
AVAILABILITY: ABI/INFORM

Richard Immerman, head of Ohio Resource Exchange, Cleveland, Ohio, has founded his business for the exchange of hazardous wastes and believes the concept can become a multimillion dollar/year enterprise. He seeks to find markets for such wastes, based on the idea that a firm may be able to make profitable use of the wastes of another company. So far business has not been good, but Immerman is hopeful for the future. He works strictly on commission, not taking legal title to the wastes, and he claims to have about 50 major industrial clients.He uses the services of consultants to recommend new markets for the waste that is available and possible reprocessing methods. He indicates that data from the Environmental Protection Agency showing that only 10% of wastes listed with US waste exchanges have been successfully traded emphasize the need for more activity in waste marketing. He is pushing ahead with a variety of activities such as provision of waste testing services to potential customers and a computer service to handle Resource Conservation and Recovery Act paperwork involved in his dealings.
DESCRIPTORS: Wastes; Hazardous substances; Recycling; Trading; Exchange; Industrial wastes; Case studies
CLASSIFICATION CODES: 1500 (CN=Energy/Environment); 9110 (CN=Company specific)

79014751
Europe Gets a Grip on Wastes
Anonymous
Chemical Week v125n6 PP: 44-45 Aug. 8, 1979 CODEN: CHWKA9
ISSN: 0009-272X JRNL CODE: CEM
DOC TYPE: Journal Paper LANGUAGE: English
AVAILABILITY: ABI/INFORM

Even though there has not been a major chemical waste disaster in Europe, public concern is increasing and European companies are beginning to improve disposal practices and to keep better records on hazardous wastes. European governments are developing stricter disposal policies and some companies are stockpiling wastes because of uncertainty about disposal. England's Department of Environment is developing regulations for tracking wastes and controlling their disposal partly through the 1974 Pollution Control Act. Local officials control waste disposal in France and a national policy is being started through a study being done by the Environment Ministry on the inventory of waste disposal from 1974 to 1978. European companies are having difficulty getting waste disposal sites and waste exchange programs and other cooperative efforts are being initiated.
DESCRIPTORS: Europe; Waste disposal; Industrial wastes; Hazardous substances; UK; France; Germany
CLASSIFICATION CODES: 1500 (CN=Energy/Environment)

77010596
WASTE EXCHANGES DUE FOR A BOOST
Industry Week V194 N1 PP: 33-36 JULY 4, 1977 CODEN: IWEEA4
ISSN: 0039-0895 JRNL CODE: IW
DOC TYPE: Journal Paper LANGUAGE: English
AVAILABILITY: ABI/INFORM

FEDERAL REGULATIONS GOVERNING DISPOSAL OF 'HAZARDOUS' WASTES, NOW BEING DRAFTED BY THE ENVIRONMENTAL PROTECTION AGENCY (EPA), WILL ADD TO THE RED TAPE AND FRUSTRATIONS OF PLANT MANAGERS. MANY TRADITIONAL DUMPSITES WILL NO LONGER BE ABLE TO ACCEPT CONTAMINATED CHEMICALS AND OTHER RESIDUES OF THE MANUFACTURING PROCESS. ONE EFFECT MAY WELL BE A STIMULUS FOR INDUSTRIAL WASTE EXCHANGES WHICH HAVE ALREADY BEEN SPRINGING UP AROUND THE COUNTRY. AS INFORMATION CLEARINGHOUSES, WASTE EXCHANGES PLAY A MATCHMAKER ROLE,
(cont. next page)

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PROVIDING A LINK BETWEEN DISPOSERS AND FIRMS WHICH CAN USE THE CAST OFF CHEMICALS, SOLVENTS, AND OTHER WASTES. AT LAST MONTH'S NATIONAL WASTE EXCHANGE SEMINAR, PARTICIPANTS WERE WARNED OF ONE PROBLEM EXCHANGES CANNOT SOLVE - MANY TYPES OF INDUSTRIAL WASTES ARE OF TOO LITTLE VALUE TO JUSTIFY THE TRANSPORTATION COSTS OF SWAPING OR SELLING. IT WAS ALSO SUGGESTED THAT A NATIONAL 'EXCHANGE OF EXCHANGES' BE SET UP TO SWAP INFORMATION.

DESCRIPTORS: Waste disposal; Hazardous substances
CLASSIFICATION CODES: 1500 (CN=Energy/Environment)

DIALOG File 75: MANAGEMENT CONTENTS - 74-87/Dec (Copr. 1987 Information Access Co.)

291197 CWE84E1656
Waste Exchanges.
Anon
Chemical Week, Vol.134, No.20, May 16, 1984, P. 56,58,60+., Journal.

Companies can address waste disposal by internal recycling or external exchanges. Exchangers are nonprofit organizations or profit brokers. Company reluctance at waste exchange is related to third party disposal. Legal documentation trials of hazardous waste disposal also is a detriment. A table is included of major chemical waste exchange firms.
DESCRIPTORS: Tables; Waste Disposal; Recycling; Broker; Nonprofit Organization; Hazardous Materials; Environmental Surveillance; 2256; 0865; 0630; 1166; 1881; 0630; 0724

(DIALOG : Management Contents)

220911 PUR82A14523
What to Expect from a Waste Exchange.
Dillon, T.F.
Purchasing, Vol.92, No.1, Jan. 14, 1982, P. 52A9,52A11+., Journal.

Waste exchanges help companies reduce their disposal and material costs. This is a creative solution to an otherwise costly problem. There are two types of exchanges. One handles materials, sometimes purchases it, processes it, and sells it. The other type handles information only and never handles the material itself. They are referred to as passive exchanges and are usually nonprofit. Waste information exchanges publish catalogs which list items available and/or items wanted.
DESCRIPTORS: Waste Disposal; Investment; Industrial Waste; 0865; 0217; 0210

(DIALOG : Management Contents)

160305 SBR79C0021
BARTERING AND SURPLUS/WASTE EXCHANGES.
ANON
SMALL BUSINESS REPORT, VOL.4, ISSUE 3, MARCH 1979, P. 21-22.

GOODS AND SERVICES OF EQUAL VALUE ARE EXCHANGED BY TWO COMPANIES TO THEIR MUTUAL BENEFIT IN BARTERING EXCHANGES. A COMPANY CAN ALSO CHANNEL EXCESS INVENTORY INTO SURPLUS/WASTE EXCHANGES FOR CASH. BOTH TYPES OF EXCHANGES PROVIDE AN OPPORTUNITY FOR SMALL BUSINESSES TO DEAL EFFICIENTLY WITH SURPLUS.
DESCRIPTORS: BARTER; COMMODITY EXCHANGES; ECONOMICS; INVENTORY MANAGEMENT; SURPLUS; WASTE MANAGEMENT; 0430; 0019; 0677; 0216; 0666; 0865

(DIALOG : Management Contents)

147515 ASM78J0123
ASSOCIATION TAKES OVER GOVERNMENT PROGRAM FOR EXCHANGE OF INDUSTRIAL WASTES.
MCWILLIAMS, S.E.
ASSOCIATION MANAGEMENT, VOL.30, NO.10, OCT. 1978,P. 123-126.

THE GEORGIA BUSINESS AND INDUSTRY ASSOCIATION IN ATLANTA TOOK OVER THE OPERATION OF THE GEORGIA WASTE EXCHANGE PROGRAM. THE EXCHANGE WORKED WELL.
DESCRIPTORS: COMMUNICATION; MANAGEMENT; PROMOTION; WASTE MANAGEMENT; 0011; 0605; 0454; 0865

(DIALOG : Management Contents)

115488 BWE76F2138
TRYING TO SELL JUNK NATIONALLY.
ANON
BUSINESS WEEK, NO.2437, JUNE 21, 1976, P. 38H-J.

NUISANCE MATERIAL SUCH AS TERMINAL EQUIPMENT TO BE DISPOSED OF IS BEING BOUGHT UP AND RECYCLED BY HOWELL HURST WHO WANTS TO RUN A NATIONAL RESOURCE RECYCLING EXCHANGE, A NATIONAL COMPUTER LINKED NETWORK WHICH CAN MATCH COMPANIES WITH SALABLE WASTES WITH THOSE WHO COULD USE THE WASTE AS RAW MATERIALS. THE WASTE EXCHANGE THEORY HAS BEEN TRIED IN EUROPE, BUT HURST'S IDEA IS TO ALSO PROMOTE CONSERVATION.
DESCRIPTORS: BUYING BEHAVIOR; AUTOMATION; CONSUMER MOTIVATION; CONSERVATION; ECONOMICS; ECONOMIC FORECAST; RECYCLING; RAW MATERIALS; MANAGEMENT; ELECTRONIC INDUSTRY; STEEL INDUSTRY; 0508; 0073; 0125; 0630; 0677; 0149; 0630; 0450; 0605; 0295; 0290

(DIALOG : Management Contents)

106398 BWE75K10961
THE FIRST U.S. WASTE EXCHANGE.
ANON
BUSINESS WEEK, NO.2406, NOV 10, 1975, P. 96D.

MALLINKRODT, INC. HAS DISCOVERED ONE WAY TO MARKET ITS SPENT CHEMICAL WASTES, WITH WASTE METHANOL, BUT THERE ARE 10,000 GA. PER MONTH TO DISPOSE OF. INDUSTRIAL WASTES IN EUROPE ARE HANDLED BY TRASH BOURSES WHICH BRING BUYERS AND SELLERS TOGETHER AND NOW A JOINT MISS.-ILL. TASK FORCE HAS STARTED A WASTE EXCHANGE IN ST. LOUIS, ON A LOW BUDGET.
DESCRIPTORS: RAW MATERIALS; BUDGETING; WASTE MANAGEMENT; TASK FORCE; SALES MANAGEMENT; PROFIT MOTIVE; POLLUTION; EXTERNAL ENVIRONMENT; CHEMICAL INDUSTRY; 0450; 0510; 0865; 0325; 0442; 0296; 0653; 0160; 0297

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1403389
One's waste is another's raw material.
Chemical Week September 3, 1986 p. 15

Industrial waste-exchanges are computerizing their operations and extending their areas of operation due to strong business. The companies say they perform a valuable service by tracking down waste materials that certain companies can usea as raw materials in their own processing. In 1985, the Northeast Industrial Waste Exchange (Buffalo, New York) found new users for nearly $1.1 million worth of wastes. In 1984 it exchanged only $189,000 worth. The company currently lists industrial wastes that are available and those that are needed in a quarterly catalog, and will accelerate the process with a computerized database. Industrial Material Exchange Service (Springfield, Illinois) will also go online soon. In 1985 the firm directed over 3.5 million gallon of waste material worth $7 million to new users. Great Lakes Waste Exchange (Grand Rapids, Michigan) says it received 217 inquiries about 110 listings in its exchange catalog in 1st-half 1986. Some 11% were for acids, 21% were for metals and metal-containing sludge and 34% were for solvents. The firm says that 10% of the inquiries in 1986 have been for waste oil. According to M Siekerka of the Industrial Material Exchange Service, the 1984 Resources Conservation and Recovery Act amendments have helped the waste exchange business by making recycling more visible. W Rosenbaum of Eticam, a treatment, storage and disposal facility, points out that the Resources Conservation and Recovery Act amendments have increased the need to exchange materials instead of disposing of them.

*1USA *United States *2800600 *Chemical Wastes *60 *market data

1226673
Small Hauling Firm Grows Into Multi-Faceted Company.
World Waste (formerly Solid Wastes Management) May 1985 p. 20,21

Environmental Technology (Richmond, Virginia) specializes in waste reduction, treatment and transfer services for industry and municipal sludges. It grew from a 2-man, 1-truck operation to a multi-service waste management company by providing several services including transportation, disposal, closure for hazardous waste sites, chemical analysis and recycling. Its computerized information system identifies waste generators and users of industrial wastes to provide a waste exchange service. Specialized equipment includes trailers, vacuum tanks and flotation tanks. An example of its operation at a wire mill is described.

*1USA *United States *4953000 *Refuse Systems *19 *line of business; *Environmental Technology

1212623
New databases are announced for industrial wastes and for plastics.
Chemical Engineering May 27, 1985 p. 17,18

Northeast Industrial Waste Exchange (Syracuse, New York) will introduce the 1st electronic database for wastes. It will enable producers of wastes or potential buyers seeking certain types of wastes for their recycled value to reach each other. PC users with a modem may access the database daily. Special search features

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will enable users to rapidly determine what specific wastes are listed or select wastes by region. The Plaspec Interactive Data Bank will be established by Plastics Technology in 6/85. The database will include price and market news on plastics and resins, machinery specifications for plastic molding and forming equipment and an index of materials and equipment vendors.

*1USA *United States *7375990 *Other Database Vendors NEC *36 *services data; *Northeast Industrial Wast

1185156
Your industrial waste--garbage or gold?.
Process Industries Canada (formerly Canadian Chemical Processing) May 1985 p. 12-17

Canada: Some industrial waste could be used profitably. Opportunities to reuse industrial wastes are being actively pursued, but industry experts must be aware of potential waste reuse opportunities in industry sectors with which they may not be familiar. The Canadian Waste Materials Exchange distributes lists of available industrial waste streams and waste streams wanted as substitute raw materials. The CWME was established in 1976 to act as an information exchange rather than an active waste brokerage. The agency issues 6 newsletters per year and passes reader inquiries to the proper companies. Some 3,700 companies participate, and 90 percent of the listings generate inquiries. The amount of wastes thus transferred totals 217,000 tons per year worth $6.85 million. Regional waste exchanges have also been established in Manitoba, Alberta and Ontario. The Ontario Waste Exchange is also researching modification of wastes to make them more usable and is exploring possible new uses for waste streams. Listings are also being shared with Great Lakes Waste Exchange in Michigan, the Industrial Materials Exchange in Illinois and the North East Waste Exchange in New York.

*2CAN *Canada *5093000 *Scrap & Waste Materials Whsle *42 *pollution

1172533
Industrial Waste Exchanges.Industrial waste exchanges result in avoided disposal costs for the donating company and reduced energy and dollar costs for raw materials for the receiving company.
NTIS Energy Tech Notes December 1984 p. 9

Such exchanges allow industrial process wastes, byproducts, surpluses, or materials that do not meet manufacturing specifications to be transferred from one firm to another that can use the wastes as process inputs. There are 2 types of exchanges. The first functions as an information clearinghouse that acts as an intermediary but does not handle the materials. The second type of exchange is a facility that actually transfers materials for a brokerage fee.

*1USA *United States *4953010 *Industrial Solid Waste *42 *pollution

1053623
Waste Exchanges: A Little-Known Option For a Growing Dilemma.
Chemical Business (Supplement to Chemical Marketing Reporter) May 1984 p. 25,27+

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What to do with hazardous waste is a dilemma for small-to-medium-sized firms. Larger organizations can support internal recycling programs or can interest commercial recyclers; the smaller firm is limited to disposal through incineration or dumping. One solution is a non-profit waste information exchange service. TVA is joining the Midwest Industrial Waste Exchange to encourage the use of the exchange which puts the generator of wastes and the recycler in contact. All of the exchanges publish catalogs or bulletins listing wastes available and wastes wanted. All provide 'information only' service and charge a modest fee or none at all for listings. Some are state-subsidized while others receive some state support and funded by business councils or other private organizations. Presently, 15 such exchanges exist in the US and Canada. The exchanges msut handle confidentiality, paperwork and currency of information issues to become truly effective.

*1USA *United States *4953700 *Hazardous Waste Treatmnt,Storge,Disposl *36 *services data

1030452
Waste exchanges: an underutilized way to help the bottom line.
#Chemical Week May 16, 1984 p. 56-60+

Waste exchanges help sellers eliminate disposal costs and give buyers a source of cheap raw materials. There were 3 US waste exchanges in 1978 and 24 at end-1983. But at least 15 have gone out of business during that time, and the survivors are treading water. W European exchanges have a 30-40% transfer rate, vs only 10% for US exchanges. Fuel and feedstock costs have been high for some time in Europe, and companies have long had a conservation mentality. But in the US recycling is a relatively new idea, and many companies that do recycle do so internally. Union Carbide saved $1 mil in material and processing costs and avoided disposal costs of $1.7 mil in 1983 by in-house recycling.

Most 'passive' waste exchanges are operated on a nonprofit basis by local or state govts. They publish newsletters containing information obtained from industrial waste producers about available byproducts or waste streams. Possible buyers list materials they need. No company names are used. The exchange introduces prospective buyers to prospective sellers, leaving the companies to conduct business on their own. Brokerage operations charge a presale fee or postsale commission, and will actively seek buyers for a selling company's waste stream. Article discusses the operations of waste exchanges in detail.

*1USA *United States *4953202 *Private Solid Waste Recvry *42 *pollution

836700
Canada: A well managed waste program reduces environmental contamination and the ultimate cost of decontamination and reclamation, according to WH Stiebel and RE McArthur of Monenco Ontario.
Canadian Chemical Processing October 1982 p. 28-32

Waste management programs try to minimize the volumes of all waste streams through a recovery and recycling program; on-site contamination of soils; contamination of surface water and groundwater, preventing off-site migration of contaminants; and site decontamination and reclamation expenditures during plant decommissioning. A good waste management program should inventory all processes and

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process waste streams; characterize all waste produced, including type and volume; assess potential for waste material recovery/recycling; analyze and upgrade on-site treatment methods; analyze ways to minimize waste volumes, including waste exchange; analyze integrity of all on-site treatment, storage and waste disposal areas, and examine the amount of materials routed to each area; and assess the integrity of all off-site storage and disposal areas used and develop a waste disposal management plan. On-site waste management may entail treatment lagoons or pond, land treatment (biodegradation), and land burial for treated solids. On-site waste disposal can restrict future land use and influence land values, generating significant remedial action expenditures if the plan is ill-conceived or poorly managed.

*2CAN *Canada *9913700 *Environmental Management *23 *environmental mgmt

829013
Mexico: The govt has set up a waste exchange for industrial residue to promote recycling.
#Chemische Industrie September 1982 p. 613,614
Language: German

The exchange is based on the model of W Germany's Chemical Industry Fedn's (VCI) waste exchange. In 8/4/80-12/4/81, 111 companies utilised the system. Over 60% of the published offers came from the Mexico State, including Mexico City. The state also accounted for over 70% of demand. Offers concentrated on chemical residues, followed by fibres and metals. Enquiries were 40% for chemicals, vs 16% for rubber and 16% for scrap. Article details the setting up and the admin of the exchange.

*3MEX *Mexico *4953200 *Solid Waste Recovery *97 *govt functn NEC

706731
CECOS Intnl (Niagara Falls, NY) has developed a 'total management concept' tailored to today's hazardous waste management demands and expectations, according to RA Stadelmaier, CECOS pres.
#Waste Age October 1981 p. 31-33+

'CECOS offers industry and government a full range of services and expertise through a combination of in-house and subcontracting capabilities.' It offers industrial waste water treatment, recovery, and disposal; fuel feedstock, incineration, and transportation brokerage services; industry programs including waste management audits and waste exchange. Additionally, CECOS' Special Environmental Services Div provides hazardous waste site abatement, industrial cleaning services, packaging and containerization services, and emergency response services 24-hr/d.

*1USA *United States *4953700 *Hazardous Waste Storage & Disposal *23 *environmental mgmt; *CECOS Intnl

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700775
Southern Illinois U (Carbondale) implemented a program to identify, collect, store, treat, and dispose of hazardous chemical wastes generated on campus.
Solid Wastes Management now: World Wastes see: Wld Wastes November 1981 p. 34,35

An integral component of the disposal phase is the waste exchange program, through which waste chemicals are treated and reused on campus, thus negating the need for their disposal. The main advantage of the chemical waste exchange program is that these chemicals are removed from the hazardous waste stream, the concept of recycling is promoted, and university chemical costs are reduced.

*1USA *United States *4953700 *Hazardous Waste Storage & Disposal *36 *new services
1USA United States 8220100 Public Colleges 36 new services

676266
The Northeast Industrial Waste Exchange has invited 6700 companies to participate in its newly formed information clearinghouse for both hazardous and non-hazardous industrial wastes.
Resource Recovery Update July 1981 p. 1

The companies were invited from New York, New Jersey, Pennsylvania and all of New England. The Exchange will publish a periodic catalog of industrial wastes available for reuse; the catalog will be distributed to recyclers, reclaimers and other companies throughout the service area.

*1USA *United States *4953200 *Solid Waste Recovery *36 *services R&D

670486
The US textile industry's energy efficiency and conservation record is outstanding, but mills must use all available fuel sources in the 1980s.
Textile World August 1981 p. 39-41

Malden Mills has a $1 mil, 15,000 lb/hr steam generating system fueled by a 90/10 textile-miscellaneous waste mix. Danskin has a waste incinerator at its York, Pa, plant, with waste coming from 5 plants and an outlet store. The incinerator produces 5,000 lbs/hr of steam at 100 psi to meet 65% of plant energy requirements. Wellman Industries' textile waste is insufficient to supply an incinerator so it has contracted with the county govt to supply 15,000 tpy of processed municipal waste for 15 yrs. The system will eliminate requirements of 700,000 gals/yr of fuel oil, or 100 mil cfy of natural gas. Fieldcrest Mills' Columbus, Ga, plant has a new textile incineration system. Hot air from the incinerated textile waste exchanges with makeup air entering the finishing dryers. Burn tests show that carpet waste has an average heat content of 9,000 Btus, or 90% of anthracite coal's heat value, and a large carpet plant can generate 6 mil lbs/yr of carpet waste. Article examines environmental impact, high-temperature incineration of waste, and ash disposal.

*1USA *United States *2200000 *Textile Mill Products *47 *energy conserved

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667507
The Northeast Industrial Waste Exchange has been established for the negotiated transfer of reusable manufacturing byproducts among generators of both hazardous and non-hazardous industrial wastes in New York, New Jersey, Pennsylvania and New England.
Solid Wastes Management now: World Wastes see: Wld Wastes August 1981 p. 16

The exchange wll publish a quarterly catalog listing both available waste materials and materials that are wanted. The operation is being sponsored by the Manufacturers Assn of Central New York, with assistance from the Central New York Regional Planning & Development Board.

*1USA *United States *4953010 *Industrial Solid Waste *12 *new organization

614429
Chemical firms are under pressure to find customers for their coproducts and to reduce the volume of waste materials they produce, because waste must now be accounted for under RCRA rules.
#Chemical Week February 4, 1981 p. 37-40

Some chemical producers use the terms coproduct and byproduct interchangeably, but Monsanto claims that byproduct implies little or no value in the side stream, while coproducts are valuable. The idea of coproduct utilization is not new; firms currently seeking to use coproducts include Halcon International, Borden, Witco Chemical and Ethyl. Monsanto Chemical Intermediates' program covers resource conservation, social responsibility and economics, both in profits from sales and in reducing disposal costs. The firm has worked with amine and nitrile streams from its nylon processes, styrene streams, and coproducts from its liquid cracking joint venture with Conoco. These wastes were previously incinerated, burned for fuel, injected in deep wells or put into landfills. The waste is now either sold as is to new markets or chemically upgraded, purified or reacted to make new products. Marketing coproducts can help keep the economics of a certain process profitable. According to FR Hogeman of Ethyl, the firm has a substantial amount of coproducts from the Pasadena, Tex, linear primary-alcohol plant, including linear long-chain alpha-olefin-paraffin streams, high-molecular-weight alcohols and alum. These products must be marketed in order to keep the plant profitable. Some firms do not want to bother with market development for their coproducts. They can use US/Canada clearinghouses set up by state or regional business assns, or state university extension services and environmental depts. Listings are available of needed products and products that are available at a modest fee. These waste-exchange businesses are experiencing a boom now, as companies begin to cope with RCRA's regulations. If wastes are deemed hazardous, they can be disposed of only in federally-approved facilities, resulting in vastly increased costs for waste disposal and pressure on generators to either reduce waste volume or find buyers for the wastes.

*1USA *United States *2800000 *Chemicals *93 *pollution regulatn
1USA United States 2800000 Chemicals 93 pollution regulatn
1USA United States 9106400 Pollution Control & Abatement 93 pollution regulatn
1USA United States 9106400 Pollution Control & Abatement 93 pollution regulatn

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614047
Directory of nonprofit industrial waste exchanges is presented by state with names and addresses.
Waste Age November 1980 p. 44

The exchanges provide potential markets for industrial wastes for which no established markets exist. Waste may be listed with full protection of the participants' confidentiality.

*1USA *United States *4953200 *Solid Waste Recovery *36 *services data

614046
The Midwest Industrial Waste Exchange (St Louis, Mo) has achieved success as a regional clearinghouse for waste transfers.
Waste Age November 1980 p. 43,44

It publishes a quarterly Clearinghouse Catalog which includes waste-wanted and waste-available listings, as well as a news and information section and is distributed at no charge. The waste-exchange concept offers relief both to the industrial community and the environment. A company interested in a particular waste listed nonconfidentially first mails a letter to the exchange requesting information concerning that waste, identifying it by code number. The exchange then informs each party in writing of the other's identity. Contact may be initiated by either party.

*1USA *United States *4953200 *Solid Waste Recovery *36 *services data

582710
Japan has started up a waste exchange program pilot study.
Paper Trade Journal August 30, 1980 p. 84

Waste collectors give households toilet paper in exchange for waste paper. Other waste materials in the exchange include oil, sludge, plastics, wood, construction waste, acids and certain chemicals.

*9JPN *Japan *5093000 *Scrap & Waste Materials Whsle *97 *govt functn NEC

582107
The EEC could recycle 21 mil m tpy of waste paper, iron, aluminium, textiles and tires contained in the 30.6 mil m tpy of mixed waste produced in the EEC.
Chemische Industrie August 1980 p. 505
Language: German

According to several reps at the Intnl Solid Wastes Congress at Wembley, England, many problems associated with waste recovery remain unsolved. There are no general methods for sampling and analysing untreated waste and recovered products. There are 20 waste exchanges of which 2 are in W Germany and 4 in the US, with others in Switzerland, Belgium, the Netherlands, France, Italy and Austria.

*4 EC *European Community *4953200 *Solid Waste Recovery *42 *pollutant recycled

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572092
Midwest Industrial Waste Exchange supplies many industries with chemical wastes.
Journal of Commerce July 29, 1980 p. 5

Listings are coded so that the firm contributing the waste is not mentioned. Interested firms must go through the waste exchange to complete transactions, protecting company secrets.

*1USA *United States *4953010 *Industrial Solid Waste *36 *new services; *Midwest Industrial Waste

432672
The World Assn for Solid Waste Transfer and Exchange will attempt to form a global computer network for waste exchange, and has invited regional waste-exchange clearinghouses to participate in a pilot program at no cost or obligation.
Chemical Engineering July 31, 1978 p. 35

Formed by a group of California marketing specialists, the Assn will also make its software available for the development of private waste-exchange data banks.

*0 W *World *5093000 *Scrap & Waste Materials Whsle *12 *new organization

412780
Canada has mailed its first list of wastes available through its Waste Materials Exchange formed in Nov 1977 by a $42,000 govt grant.
Chemical Engineering March 13, 1978 p. 48-49

This is the country's third attempt at waste exchange, and is expected to attract attention due to having been put on a national basis. European waste exchanges started in 1972 have been growing in popularity.
The Canadian exchange is managed by Ontario Research Foundation (ORF), Mississauga, a nonprofit contract organization partially funded by the govt. The ORF mailing went to 42,000 firms, including 2,500 chemical companies, 315 petroleum refiners and 1,400 rubber and plastics manufacturers, and is intended to conserve resources and help avoid dumping by matching up firms that want to reuse waste material coming from other firms. There is no charge for the service.

*2CAN *Canada *5093000 *Scrap & Waste Materials Whsle *36 *new services

322132
The US' first industrial waste exchange, an industrial waste marketplace under the operation of the St Louis Regional Commerce and Growth Association (RCGA), was established in St Louis, Mo, on October 30, 1975.
Journal of Commerce October 31, 1975 p. 5

RCGA would operate as a trading organization through which companies could offer waste products for sale and buyers could bid for them. RCGA described the organization both as a direct service to industry and as an indirect environmental and resource conservation service to the general public. It said that the St Louis Waste Exchange, which was modeled after the successful European waste bourses is

(cont. next page)

DIALOG INFORMATION SERVICES, INC.

DIALOG
DIALOG File 16: PROMT - 72-87/DEC, WEEK 2 (Copr. Predicasts Inc. 1987)

the first operation of its kind in the US. It explained that the RCGA, as operator of the exchange, would serve as a clearing house for the dissemination of information on waste or residual materials either available or wanted.

*1USA *United States *5093000 *Scrap & Waste Materials Whsle *17 *Trade Groups

APPENDIX C
List of References

APPENDIX C

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APPENDIX D
List of Waste Exchanges
Contacted During Survey

Alberta Waste Materials Exchange
4th Floor Terrace Plaza
4445 Calgary Trail South
EDMONTON, Alberta
T6H 5R7

Attention: Ms. Karen Beliveau
Manager Ms. Beliveau

Manitoba Waste Exchange
c/o Biomass Energy Institute
1329 Niakwa Road
WINNIPEG, Manitoba
R2J 3T4

Attention: Mr. James Ferguson
Manager Mr. Ferguson

British Columbia Waste Exchange
Recycling Council of British Columbia
2150 Maple Street
VANCOUVER, British Columbia
V6J 3T3

Attention: Ms. Catherine Ryle Ms. Ryle

Canadian Waste Materials Exchange
Ontario Research Foundation
Sheridan Park Research Community
MISSISSAUGA, Ontario
L5K 1B3

Attention: Dr. Robert Laughlin Dr. Laughlin

Peel Regional Waste Exchange
Regional Municipality of Peel
10 Peel Center Drive
BRAMPTON, Ontario
L6T 4B9

Attention: Mr. Glen Milbury Mr. Milbury

Ministere de l'Environment
Direction de la recuperation et du recyclage
3900, Marly, boite 35
SAINTE-FOY, Quebec
G1X 4E4

Attention: Mr. Daniel Champagne Mr. Champagne

Indiana Waste Exchange
Environmental Quality Control
1220 Waterway Boulevard, Box 1220
INDIANAPOLIS, IN 46206
U.S.A.

Attention: Ms. Karen Evans Ms. Evans

Great Lakes Regional Waste Exchange
Waste Systems Institute
470 Market Street S.W., Suite 1007
GRAND RAPIDS, MI 49503
U.S.A.

Attention: Mr. William Stough Mr. Stough

Midwest Industrial Waste Exchange
St. Louis Regional Commerce
and Growth Association
10 Broadway
ST. LOUIS, MO 63102
U.S.A.

Attention: Mr. R.C. Marquart Mr. Marquart

Southeast Waste Exchange
Urban Institute
University of North Carolina-Charlotte
CHARLOTTE, NC 28223
U.S.A.

Attention: Ms. Mary McDaniel Ms. McDaniel

Northeast Industrial Waste Exchange
Suite 122, 90 Presidential Plaza
SYRACUSE, NY 13202
U.S.A.

Attention: Mr. Lewis M. Cutler
Manager Mr. Cutler

Industrial Waste Information Exchange
Columbus Industrial Association
1646 West Lane Avenue
COLUMBUS, OH 43221
U.S.A.

Attention: Mr. Newton A. Brokaw Mr. Brokaw

Deutscher Industrie-und Handelstag
53 Bonn 1
Postfach 1446
Adenauerallee 148
WEST GERMANY

Attention: Frau Dr. F. Haenert Dr. Haenert

APPENDIX E
Copy of Questionnaire
Sent to Waste Exchanges

December 16, 1987
P8347.00

[redacted]

Dear [redacted]:

WASTE EXCHANGE SURVEY

This Questionnaire is being administered by Acres International Limited on behalf of the British Columbia Ministry of Environment and Parks in association with the Canadian Council of Resource and Environment Ministers. The information gathered from yourself and other waste exchange operators will be used to evaluate ways and means of expanding the use and productivity of waste exchanges, of achieving greater hazardous waste reduction in Canada, and of improving the financial self-sufficiency of Canadian waste exchanges.

Please complete the Questionnaire by the end of December or as soon as possible, and notify the writer of this letter at (604) 683-9141. We will then arrange for pick-up of the questionnaire for return to this office. After review, we may contact you to seek clarification of some of your responses or further information. If we have not heard from you by 04 January 1988, one of our researchers will contact you to aid in completion of the questionnaire.

We would like to stress that all information will be treated in the strictest confidence, and that no comments or remarks

. . . /2

that are made will be attributed to individuals, agencies, or companies unless prior permission has been obtained. All completed forms, notes, and correspondence will be retained in the consultant's files and will not be copied or distributed in any way.

We would also appreciate receiving a copy of your bulletin and any promotional literature available.

Thank you for your cooperation.

Yours very truly

W. Paul Levelton
Project Manager

WPL/sd

SECTION A - ORGANIZATION PROFILE

1. Name of Exchange: _____

2. Address: _____
_____
_____
_____
_____

3. Telephone Number: ( ) _____

4. Name of Contact Person: _____

5. How is the Exchange chartered?

Non-Profit Society _____

Private Corporation _____

Government Agency
- Federal _____
- Prov./State _____
- Municipal _____

Other (please specify) _____

6. What geographic area is served? _____

7. Date Exchange established: _____

SECTION 8 - TECHNICAL EXPERTISE

8. (a) Where does the Exchange's on-going technical expertise originate?

In-house _____ Waste Generating Industry _____

Consultants _____ Government Agency Staff _____

Academic Institutions _____ Other Waste Exchanges _____

Other ____ (specify) _____

9. (a) Is the Exchange involved in any hazardous waste related research?

Yes ___ No ___

(b) If yes, what areas of research? _____

_____

_____

10. (a) How many full-time employees are employed by the exchange? _____

(b) How many part-time employees? _____

(c) What academic training do current staff members have?

_____

_____

_____

(d) To what extent does the Exchange staff receive on-going specialized training?

_____

_____

_____

(e) Has the Exchange utilized any government programs in the areas of job creation and/or training:

Yes ____ No ___

If yes, which programs: _____

_____

_____

SECTION C - OPERATION AND SERVICES

11. Does the Exchange operate:

Independently _____ Part of a Larger Corporation _____

Please elaborate.

_____

_____

_____

_____

12. What general classifications do you use for listing waste materials?

_____

_____

_____

13. (a) Type of Exchange activity: Passive _____ Pro-Active _____

(b) Why was this particular mode of operation chosen?

_____

_____

_____

14. How was the Exchange started?

_____

_____

_____

15. (a) What is the stated objective or mandate of the Exchange?

_____

_____

_____

(b) How successful have you been in achieving your objective?

_____

_____

_____

(c) How do you measure your success?

_____

_____

_____

Section C - Operation and Services (cont'd)

16. (a) Does the Exchange have an implementation plan? Yes ___ No ___

(b) If so, is the plan followed closely? Yes ___ No ___

17. (a) How effective do you think current legislative and regulatory mechanisms are in promoting waste exchanges?

_____
_____
_____
_____

(b) What are the key provisions of existing legislation that have contributed to your success?

_____
_____
_____
_____

(c) In what ways does existing legislation discourage the use of waste exchanges?

_____
_____
_____

(d) Are you aware of any proposed legislation that will directly impact on your operations?

Yes ____ No ___

(Please Discuss) _____
_____
_____

(e) In your opinion, should industry be required by law to list hazardous wastes with an exchange prior to proceeding with disposal?

Yes ____ No ___

Please elaborate. _____
_____
_____

Section C - Operation and Services (cont'd)

18. (a) Who is legally responsible for the safe handling, transport, and storage of wastes listed through the Exchange in your jurisdiction?

Waste Generator _____
Reprocessor _____
Receiving Industry _____
Transportation Service _____
Waste Exchange _____
Other ____ (specify)
_____

(b) At what point does transfer of liability occur in the handling of wastes?

_____
_____

(c) Does this pose an incentive to using waste exchanges?

Yes ____ No ____

(d) If so, how? _____
_____

19. Could you provide us with the following information for the last three years, if possible?

	1985	1986	1987
Number of participating companies			
Number of waste listings			
Number of waste inquiries			
Number of listings inquired about			
Number of transactions			
Tonnage of wastes transferred			
Value of wastes transferred			

20. (a) Please provide the approximate breakdown in terms of percentage for hazardous versus non-hazardous wastes in the following categories. (Use most recently available data.)

	Hazardous	Non-Hazardous
Number of Waste Listings		
Number of Inquiries		
Number of Exchanges		

(b) To what extent does your success depend on handling non-hazardous waste?

_____
_____
_____
_____

Section C - Operation and Services (cont'd)

21. (a) Does the Exchange attempt to place a value on listed or recycled waste products?

Yes _____ No _____

(b) If Yes, how are wastes presently being valued?

_____
_____
_____

(c) How could you ensure that the true economic value was used?

_____
_____
_____

22. What could improve the ratio of the number of waste exchange inquiries made to the number of deals actually consumated?

_____
_____
_____

23. (a) To what extent does transportation (cost, distance, carrier availability, etc.) affect the operation of your exchange?

_____
_____
_____

(b) What are the average and longest distances moved by wastes for which a user has been found through your exchange?

Average Distance _____ km/miles
Longest Distance _____ km/miles

(c) What percentage (by volume) of waste transactions move by the following modes?

Road _____ % Air _____ %
Rail _____ % Water _____ %

(d) In your estimation is the transportation system and the regulation thereof (particularly as it relates to the transportation of dangerous goods) adequate to facilitate the exchange of hazardous wastes?

Yes _____ No _____

Please elaborate: _____
_____
_____

Section C - Operation and Services (cont'd)

23. (e) Do interprovincial, interstate or international regulations on the transboundary movements of hazardous wastes significantly affect the exchange of wastes?

Yes _____ No _____

If yes, in what way, and how might this be rectified?

_____
_____
_____
_____

24. (a) Is there a minimum volume of waste that you will handle for any given category of materials?

Yes _____ No ___

(b) If yes, what is this figure? _____

25. Is there a conflict between waste brokers (e.g., scrap metal dealers) and waste exchanges in your region?

Yes _____ No _____

Comments: _____
_____
_____
_____

26. (a) Does the Exchange have direct contact with specific industries, associations, etc.

Yes _____ No _____

If yes, in what way: _____
_____
_____
_____

(b) What suggestions do you have for more directly involving waste generators and industry associations in the exchange of hazardous wastes?

_____
_____
_____
_____

Section C - Operation and Services (cont'd)

27. (a) Are your current Clients long term members/participants?

Yes ____ No ____

(b) If you have uninterested or unsatisfied Clients, what are their reasons for this lack of interest or dissatisfaction?

_____
_____
_____

28. (a) Do you actively try to watch waste generators and users or do you leave it up to the interested parties to find each other through the bulletin.

_____
_____
_____

(b) How do you deal with telephone inquiries?

_____
_____
_____

(c) Have you found that once a match between a waste generator and a user has been found that the on-going exchange of the waste product is conducted outside of the Exchange?

Yes _____ No ____

Please provide an estimate of the volume of hazardous waste being exchanged in such a manner.

_____
_____
_____
_____

(d) Do you undertake to follow-up on actual or potential transactions?

Yes _____ No _____

If yes, what degree of follow-up? _____
_____
_____
_____

Section C - Operation and Services (cont'd)

29. Apart from facilitating the exchange of waste materials, what other services does your organization provide to waste generators and users?

_____
_____
_____

30. (a) Are there additional services that you would like to be able to provide?

Yes _____ No _____

Please elaborate: _____
_____
_____
_____

(b) What is preventing you from providing these services, and how could this be rectified?

_____
_____
_____
_____
_____

31. Do you need a broad geographical and listings base to be successful?

Yes _____ No _____

Please elaborate: _____
_____
_____
_____

SECTION D - FINANCE

NOTE: Information collected in this section (Questions 31 to 37) will be treated as confidential and will not be released without the prior, express written consent of the respondent. While we realize the sensitive nature of the requested information, its collection is critical to our determination of the means of ensuring the future success and effectiveness of waste exchanges in Canada.

32. Please provide information on operating costs for the years 1986, and if possible, 1987, utilizing the cost categories shown. If office space or other items are provided free of charge, please estimate the real cost of that component and provide an explanation.

	1986	1987
Salaries and Benefits		
Office Rental		
Office Costs (utilities, equipment, supplies)		
Printing		
Postage		
Purchased Services (technical expertise)		
TOTAL		

Explanation (if required): _____

33. Please list the amount of revenue received from the following sources for the years 1986, and if possible, 1987.

	1986	1987
Government - Federal		
- Provincial/State		
- Municipal/Other		
Industry		
Academic/Scientific Institutions		
User Fees/Charges		
Other (please specify)		
_____		
_____		
_____		
TOTAL		

Section D - Finance (cont'd)

34. In your opinion, are the revenues received sufficient to operate the exchange at an effective level?

    Yes ____ No ____

    If no, please estimate the shortfall between current and desired levels of funding, and identify how those funds would be utilized.

    _____
    _____
    _____

35. (a) What potential additional sources of revenue/funding are you pursuing?

    _____
    _____
    _____

    (b) Are funds available to the Exchange through private lending institutions (banks, trust companies, etc.)?

    Yes ____ No ____

36. How firm are existing sources of revenue/funding?

    _____
    _____
    _____

37. What suggestions do you have for improving the financial viability and/or self-sufficiency of waste exchanges?

    _____
    _____
    _____
    _____

38. (a) Do you charge any fees for the listing of wastes or other services performed?

    Yes ____ No ____

    If yes, please attach your schedule of fees.

    (b) What is the basis for these fees?

    _____
    _____
    _____

SECTION E - MARKETING

39. What methods of promotion are utilized by the Exchange?

Brochures	_____	Journals	_____
Seminars	_____	News Media (TV, Radio, Newspapers)	_____
Conventions	_____	Other (please specify)	_____
Education Programs	_____	_____	
		_____	
		_____	

40. (a) What proportion of your budget is devoted to promotion?

_____

_____

(b) What is your most successful method of promotion?

_____

_____

_____

41. To what extent do you rely on 'free' advertising?

_____

_____

_____

42. (a) How often do you publish and circulate bulletins listing available waste products and wastes wanted?

_____

_____

(b) How many copies of this bulletin are circulated? _____

(c) How has your circulation list been compiled?

_____

_____

_____

_____

(d) Do you consider your publication an information service or a publication to solicit more listings?

_____

_____

Section E - Marketing (cont'd)

43. (a) Do you maintain a computerized database? Yes _____ No _____

(b) If yes, is this accessible to outside parties? Yes _____ No _____

(c) If yes, how? _____

_____

_____

(d) What database system do you use? _____

_____

_____

44. How is confidentiality of data maintained?

_____

_____

_____

45. What level of communication do you maintain with other waste exchanges?

Casual (conferences, etc.) _____
Formal (networking, etc.) _____
Data Sharing (computer link, etc.) _____

Please elaborate: _____

_____

_____

_____

SECTION F - GENERAL

46. (a) What successes have been achieved by your organization in the following areas:

ORGANIZATION: _____

FINANCE : _____

MARKETING : _____

OPERATIONS : _____

(b) What are the key factors behind your successes in these areas?

_____

47. What is your most significant problem, if any, in each of the following areas:

ORGANIZATION: _____

FINANCE : _____

MARKETING : _____

OPERATIONS : _____

LEGISLATION/: _____
REGULATION

Section F - General (cont'd)

48. What suggestions do you have for alleviating the above problems?

ORGANIZATION: _____

FINANCE : _____

MARKETING : _____

OPERATIONS : _____

LEGISLATION/: _____
REGULATION

APPENDIX F
List of Industry and Government Contacts

APPENDIX F

LIST OF INDUSTRY AND GOVERNMENT CONTACTS

List of Industry Contacts

British Columbia Fabricare Association
1 - 2295 West Broadway
VANCOUVER, British Columbia V6K 2E4

Mr. Jim Fletcher (604) 731-9313
Chairman, Hazardous Waste Committee

Canadian Chemical Producers' Association
Suite 805, 350 Sparks Street
OTTAWA, Ontario K1R 7S8

Mr. Peter Budzick (416) 223-2948
Head, Hazardous Waste Subcommittee
Standing Committee on Environmental Quality

Canadian Fertilizer Institute
Suite 301, 280 Albert Street
OTTAWA, Ontario K1P 5G8

Mr. Roger Larsen (613) 230-9029
Assistant Managing Director

Canadian Paint and Coatings Association
Suite 103, 9900 Cavendish Blvd.
ST. LAURENT, Quebec H4M 2V2

Mr. Michael Cloghesy (514) 745-2611
Technical Director

Canadian Petroleum Association
Suite 3800, 1500 - 6th Avenue S.W.
CALGARY, Alberta T2P 3Y7

Mr. Gary Webster (403) 231-8079
Chairman, Environmental Planning
and Management Committee

and

Mr. Chris Kempling (416) 968-5531
Head, Environmental Engineering Group
Esso Petroleum Canada
Toronto, Ontario

Canadian Pulp and Paper Association
19th Floor, 1155 Metcalfe Street
MONTREAL, Quebec H3B 4T6

Mr. David Paavila (514) 866-6621
Director
Energy, Environment and Supplies

Canadian Manufacturer's Association
Suite 1330, 1100 Melville Street
VANCOUVER, British Columbia V6E 4A6

Mr. Blair Wilson (604) 685-8131
Vice President, B.C. Division

Footwear and Leather Institute of Canada
1010 Ste. Catherine St. Ouest
MONTREAL, Quebec

Mr. Marc LeDuc (514) 397-9397
Industrial Engineer

Tanners' Association of Canada
50 River Street
TORONTO, Ontario M5A 3N9

Mr. Ian Kennedy (416) 364-2134
President

List of Government Contacts

Department of Environment
P.O. Box 4750
ST. JOHN's, Newfoundland A1C 5T7

Mr. D.G.Jeans (709) 576-2559
Assistant Deputy Minister

Mr. Carl Strong (709) 576-5793
Director of Environmental
Investigations Division

Appendix F
List of Industry and Government Contacts - P.3

Department of the Environment
P.O. Box 2107
HALIFAX, Nova Scotia B3J 3B7

Mr. Duncan Mackay (902) 424-5300
Chief, Waste Management Planning
Environmental Assessment Division

Department of Community and Cultural Affairs
P.O. Box 2000
CHARLOTTETOWN, P.E.I. C1A 7N8

Mr. W. Phillips (902) 892-0311
Head, Air & Solid Waste Section
Environmental & Technical Services Unit

Department of Municipal Affairs & Environment
P.O. Box 6000
FREDERICTON, New Brunswick E3B 5H1

Mr. R. Lutes (506) 453-2861
Chief, Sanitary Engineering Section

Ministere de l'Environement
3900, rue Marly
STE-FOY, Quebec G1X 4E4

Monsieur C. Anctil (418) 644-3420
Directeur
Direction des substances dangereuse

Ministry of the Environment
Suite 100, 135 St. Clair Avenue West
TORONTO, Ontario M4V 1P5

Mr. G.C. Rocoski, P.Eng. (416) 323-5222
Supervisor, Industrial Program Unit
Waste Management Branch

Department of Environment and
Workplace Safety and Health
Building 2, 139 Tuxedo Avenue
WINNIPEG, Manitoba R3N 0H6

Mr. D.R. Thompson (204) 945-7083
Head, Waste Management
Environmental Control Programs

Appendix F
List of Industry and Government Contacts - P.4

Department of Environment
3085 Albert Street
REGINA, Saskatchewan S4S 0B1

Mr. Bernie Ryma (306) 787-6191
Supervisor, Industrial Programs Unit
Waste Management Section

Department of Renewable Resources
P.O. Box 1320
YELLOWKNIFE, N.W.T. X1A 2L9

Mr. L. James (403) 873-7178
Environmental Engineer
Pollution Control

Department of Renewable Resources
Box 2703
WHITEHORSE, Yukon Y1A 2C6

Mr. Walter Bilawich (403) 667-5957
Lands, Parks and Resources

Department of Environment
Oxbridge Place
9820 - 106th Street
EDMONTON, Alberta T5K 2J6

Mr. Tom Rogers (403) 427-5868
Pollution Control Division

APPENDIX C

Copy of Questionnaire Used
in Interviews with Industry

January 18, 1988

WASTE EXCHANGE SURVEY

Acres International Limited is conducting a study of waste exchanges on behalf of the British Columbia Ministry of Environment and Parks in association with the Canadian Council of Resource and Environment Ministers.

Waste exchanges are operations in which a middleman arranges for the transfer of waste generated from one company to be used as raw materials in the operation of another company. In 1978 Environment Canada commissioned the Ontario Research Foundation to start up the Canadian Waste Materials Exchange. In 1984 an Ontario Waste Exchange was initiated and operates in conjunction with the Canadian Waste Materials Exchange. This was followed by a Manitoba waste exchange in 1984 and one in Alberta in 1985.

The information gathered will be used to evaluate ways and means of expanding the use and productivity of waste exchanges, of achieving greater hazardous waste reduction in Canada, and of improving the financial self-sufficiency of Canadian waste exchanges.

We would appreciate your attention to the attached Questionnaire. One of Acres researchers will contact you by telephone in the near future to take down the information and discuss it with you.

All information will be treated in the strictest confidence, and that no comments or remarks that are made will be attributed to individuals, agencies, or companies unless prior permission has been obtained. All completed forms, notes, and correspondence will be retained in the Consultant's files and will not be copied or distributed in any way.

We thank you for your assistance.

Yours very truly

W. Paul Levelton
Project Manager

WPL/sd

WASTE EXCHANGE SURVEY

1. Name of Association: _____

2. Address: _____
_____
_____
_____

3. Telephone Number: ( ) _____

4. Name of Contact Person: _____
Title: _____

5. Number of Members: _____

6. Average size of member companies: Small ____ Large ____

7. What geographic area is served? _____

8. Is a journal/publication periodically sent to members containing news items of interest to the industry? _____

9. Within your organization or industry, are there any formal efforts (committees, programs, etc.) to develop or exchange information related to waste management?
_____
_____

10. Are you familiar with the concept of waste exchanges? _____
Are you familiar with Canadian Waste Materials Exchange in Mississauga? __
Any other waste exchanges? _____

11. To your knowledge, have any of your members utilized the programs offered by waste exchanges? _____
_____

12. Does your association provide funding for any of the waste exchanges in Canada? Yes _____ No _____

If so, which exchanges _____
_____

13. What types of waste materials are generated by members of your association, and how are they generally 'disposed' of? _____
_____
_____

14. What types of waste materials from other industries might be suitable for reuse by your members? Do you know of any efforts to seek such materials?
_____
_____
_____

15. Is the industry active in seeking methods of recycling its waste products?

16. In your opinion, what are the most important impediments to the recovery and recycling of wastes (particularly hazardous ones) within your industry in each of the following categories:

    (a) Economic:

    (b) Technological:

    (c) Regulatory:

    (d) Information:

17. Do you have any comments on the relevance of waste exchanges to your industry, or suggestions for involving industry associations in the exchange of wastes?

APPENDIX H
Waste Classification Systems

APPENDIX H-1

CLASSIFICATION OF WASTE MATERIALS

Canada

1. Organic Chemicals and Solvents

2. Oils, Fats and Waxes

3. Acids

4. Alkalis

5. Other Inorganic Chemicals

6. Metals and Metal Containing Sludges

7. Plastics

8. Textiles, Leather and Rubber

9. Wood and Paper Products

10. Miscellaneous

APPENDIX H-2

CLASSIFICATION OF WASTE MATERIALS

United States

1. Acids
2. Alkalies
3. Other Inorganic Chemicals
4. Solvents
5. Other Organic Chemicals
6. Oils and Waxes
7. Plastics and Rubber
8. Textiles and Leather
9. Wood and Paper
10. Metals and Metal Sludges
11. Miscellaneous

APPENDIX H-3

CLASSIFICATION OF WASTE MATERIALS

West Germany

1. Wood
2. Leather
3. Plastic
4. Textiles
5. Paper
6. Chemicals
7. Rubber
8. Metal
9. Glass
10. Other

APPENDIX H-4

CLASSIFICATION OF WASTE MATERIALS

Austria

1. Domestic and agricultural waste
2. Vegetable oils, fats, animal wastes
3. Leather
4. Wood
5. Paper
6. Stone, earth, ashes
7. Glass
8. Rubber and old tires
9. metals
10. acids
11. Alkalies
12. General
13. Paint, lacquers, glues
14. Chemicals
15. Mineral oil products
16. Foams
17. Plastics
18. Textiles
19. Miscellaneous

APPENDIX I

Profile of Southeast Waste Exchange

SOUTHEAST WASTE EXCHANGE

a program of the UNCC Urban Institute

ANNUAL REPORT

1986 - 1987

SOUTHEAST WASTE EXCHANGE

STATISTICS

July 1, 1986 - June 30, 1987

		Total 1984-85	Total 1985-86	Total 1986-87	Percentage of Increase Ove 1985-86
1.	Total listings in Waste Watcher	227	301	402	33%
2.	Total inquiries to listings in Waste Watcher	357	618	1,059	71%
3.	Total number on mailing list	1,100	1,620	2,052	27%
4.	Total number of Waste Watchers distributed (conferences, mailing, etc.)	8,000	9,000	14,000	56%
5.	Total industries mailed recycling materials (SEWE brochures, local, state and regional information)	4,043	12,050	27,732	130%
6.	Total number of members on Advisory Board	14	16	14	
7.	Total requests for general information on the SEWE	643	876	1,736	98%

SOUTHEAST WASTE EXCHANGE

MATERIAL ASSESSMENT 1986-87

Type of Material	Number of Listings	One Time Cost Benefit	On-going Cost Benefit	Pounds	Gallons
Acids	34	$ 199,340	$ 112,400	702,100	43,640
Alkalis	20	9,920	52,760	10,640,240	36,000
Other Inorganic	48	24,639	149,450	1,883,167	124,495
Solvents	39	67,000	73,603	0	850,360
Other Organics	22	0	0	0	0
Oils/Waxes	34	9,300	99,769	0	181,688
Plastics/Rubber	52	20,250	275,050	6,491,175	0
Textiles/Leather	32	0	48,900	126,000	0
Wood/Paper	25	9,200	300	580,000	0
Metals/Metal Sludge	29	3,000	106,505	254,701	0
Miscellaneous	67	4,120	1,296	40,000	60
TOTALS	402	$346,769	$920,033	20,717,383	1,236,243

Total Transfers	145
Total Inquiries	1,059
Total Gallons*	3,825,916
Total Pounds*	30,607,328
Total Cost Benefit	$1,266,802

*Notes Formula used is 8 lbs/gal.

SOME EXAMPLES OF SUCCESSFUL EXCHANGES

- A company earned $1,296 from the transfer of used batteries through referrals from the Exchange.
- A company earned $1,700 from the sale of 425 plastic barrels.
- Another company saves $18,130 in disposal costs annually, through a transfer of spent ferric solution.
- One industry earned $300 from the sale of wooden pallets.
- A university transfered 75 gallons of wax and refinishing materials for a savings of $600 to the other organization.
- Another company earns $20,700 annually from the transfer of 6,000 pounds of textile mill waste. This is an ongoing relationship.
- One company transfered 60 gallons of chemicals for a savings of $1,000 in disposal costs.
- A manufacturing company was able to transfer 8,800 gallons of hydraulic oil for a savings of $2,400 in disposal costs.
- An electronic manufacturing company transfered 180 pounds of sodium cyanide for a savings of $1,440 to the company receiving the material.
- Another industry has developed an ongoing relationship with a company who can use their waste oil, saving the industry $5,400 annually in disposal costs.
- A company is saving $110,000 annually on the transfer of 500,000 pounds of phosphoric acid.
- A one time transfer of 18,000 pounds scrap plastic materials was made, earning the company $900.
- A textile company has an ongoing relationship with another company, transferring 59,000 pounds of textile waste for a earnings of $2,800 annually.
- Another company made a one time transfer of 2,200 pounds of phosphoris acid for a savings of $560.
- A Broker purchased 240 pounds of potassium permangante for a savings of $480 in disposal costs.
- Another company earned $180 from the transfer of 450 pounds of sodium pyrophosphate decahydrate.
- An industry sells 1,825 gallons of used hydraulic oil to another company for an earnings of $456.25 annually.
- A company earned $9,900 from the transfer of 825 gallons of micro-biocides.

- A transfer of 5,000,000 pounds of aluminum chloride is saving one industry $60,000 annually.
- Another company transfers 110 gallons of metalworking fluid for a savings of $150 to the industry that can use the material.
- Another company has an ongoing transfer of 5,000 pounds of textile cutting waste for a cost benefit of $700 annually.
- A manufacturing company is able to use another industry's used hydraulic oil for a savings of $1,825 in the cost of new material.
- A company is earning $1,000 annually through the transfer of 2,000 gallons of waste oil.
- A Broker purchased 220 gallons of MEK from a company, saving them $440 in disposal costs.
- A company earned $140 through the transfer of 385 gallons of naphthenic oil.
- A manufacturing company earned $900 in a one time transfer of 10,000 pounds of plastic scrap.
- Another industry found a buyer for 440 gallons of sodium bromide, saving themselves $264 in disposal costs.
- One industry saved $1,825 in disposal costs through a transfer of waste cutting oil.
- A company was able to transfer 13,000 pounds of waste caustic for a cost benefit of $1,440.
- An industry transferred 495 gallons of mixed solvents for a cost benefit of $321. The company transferring the mixed solvents saved $150 in disposal costs.
- Another company is saving an industry $12,500 in disposal costs through a transfer of 640,000 pounds of calcium chloride.
- One company earned $400 through the transfer of 220 gallons of surplus acids.
- A company earned $1,113 through the sale of 495 gallon of mixed solvents for degreasing operations.
- A laboratory saved another company $55 in disposal costs through the transfer of 55 pounds of sodium pyrophosphate decahydrate.
- A company was able to sell 1,000 pounds of plastic pellets for an earnings of $2,000.
- A manufacturing company is saving $1,500 in disposal costs annually through the transfer of 3,300 gallons of waste stamping oil.
- An industry is saving $1,100 annually in disposal costs, through a transfer of 3,100 gallons of waste oil.

- A company is saving another industry $8,000 annually in disposal costs on the transfer of 12,000 gallons of waste caustic.
- Another company transfered 303 pounds of miscellaneous inorganic chemicals for a one time earnings of $500.
- Another company earned $2,000 from the transfer of lab paks.
- A manufacturing company is saving $825 annually from a transfer of 3,300 gallons of stamping oil.
- A company realized a one time cost benefit of $400 on the transfer of their lab paks.
- A Broker was able to place 6,600 pounds of micro-biocides with various customers, saving a company $5,250 in disposal costs.
- Another industry earned $1,200 in a one time transfer of 300 steel drums.
- A chemical company was able to transfer 323 pounds of nickel carbonate, saving $450 in disposal costs.
- A lab is able to transfer 32,000 pounds of iron oxide for earnings of $1,600 annually.
- Another company earned $5,500 from a transfer of 11,000 gallons of hydrofluoric acid (surplus material). The industry transferring this material saved approximately $14,800 in disposal costs.
- A transfer of 12,000 gallons of sodium bromide resulted in annual earnings of $2,400 for another industry.
- $200 in disposal costs were saved by one industry on the transfer of 1,000 pounds of plastic pellets, extrusion material.
- A chemical company was able to transfer 550 gallons of trichlorobenzene/biphenyl/emulsifiers/water for a one time earnings of $330.
- $17,500 was earned in a one time transfer of 11,000 gallons of hydrofluoric acid (new material) through use of the Exchange.
- A company is earning $600 annually from a transfer of 440 gallons of 1.1.1. trichloroethane.
- Another company earned $1,600 through the transfer of 8,000 pounds of tri-sodium phosphate.
- An industry donated a semi-load of preformed styrafoam for a savings of $5,450 in the parks and recreation projects, as well as some elementary school projects, in one county.
- A company is earning $3,740 reclaiming and returning etching waste to a manufacturing company.
- A medical company was able to find a buyer for one pound of mercury, earning themselves $200.

- A company is saving $1,000 in disposal costs through a transfer of 2,000 gallons of waste oil annually.
- A company is earning $12,000 annually, through a transfer of litho printing wastes.
- Paper recycling is earning another company $8,400 annually. Approximately 420,000 pounds are being transferred.
- A manufacturing company is earning $15,600 from the sale of 10,400,000 pounds of fly ash material. This company feels they are saving $26,000 in disposal costs also.
- The transfer of 10,000 gallons of spent sulfuric acid from another company is saving one industry $2,4000 annually.
- A garage was able to transfer 50 used batteries for an earnings of $25.00.
- 144,000 gallons of toluene is being transferred through use of the Exchange, for an earnings of $7,200 annually. This company is saving $21,600 in disposal costs.
- A textile mill is able to sell 20,000 pounds of synthetic mill waste for a cost benefit of $1,000 to their company.
- A transfer of 120,000 pounds of polystyrene, polypropylene, and polyethylene is earning another industry $28,800 annually.
- Another industry earned $800 in a one time transfer of 800 steel drums.
- A hospital was able to save $2,000 in disposal costs on a transfer of 20 pounds of mercury.
- One industry saved another company $1,200 in disposal costs on a transfer of 220 gallons of chlorinated solvents.
- A solvent recycling firm established an on-going relationship with a bearings manufacturer to recycle solvents for an earnings of $1,000 per month.
- A transfer made through the Exchange is earning one industry $1,320 annually from the sale of 6,000 pounds of copper sludge. They are also saving $3,960 in disposal costs on this material.
- A company is earning $9,600 from recycling a transfer of 48,000 gallons of solvent blend. The company disposing of this material is earning $1,920 annually.
- Another company is transferring 10,000 gallons yearly of waste tab lube solvents for a cost benefit of $1,500.
- $2,000 was saved by a company who could use 3,000 pounds of copper filter cake, a by-product of another industry. This industry was also able to avoid disposal costs.